PRINCIPLES AND METHODS OF TEACHING.

PRINCIPLES AND METHODS OF TEACHING.

BY

JAMES WELTON, M.A.,

PROFESSOR OF EDUCATION IN THE UNIVERSITY OF LEEDS;
AUTHOR OF "THE LOGICAL BASES OF EDUCATION," "A MANUAL OF LOGIC," ETC.

LONDON: W. B. CLIVE,
University Tutorial Press Ld.
(*University Correspondence College Press*),
157 DRURY LANE, W.C
1906.

PREFACE.

The essential purpose of every book on teaching must be to help teachers in their actual daily work. In this way only can it effectually assist them when they offer themselves for examination in that work. An answer to a question on the practice of teaching is valuable exactly in proportion as it shows that the writer has not only read about the subject, but has assimilated the principles laid down in his text-book and made them part of that living thought which finds expression in the daily work of the class-room. A competent examiner discriminates at once between such answers and those which are mere verbal reproductions of text-book methods which have never influenced the writer's practice. It is therefore hoped that this book may be of value to candidates for examination in the subject of which it treats by helping them to become better teachers.

The treatment is meant to be theoretical—in the sense of setting forth a consistent and co-ordinated body of doctrine. Such theory is, of course, involved in all true practice. No attempt has been made to set forth explicit directions how to carry out every small piece of teaching. The model for a work on teaching should not be a book on cookery, with its detailed recipes directing the reader how to produce by rule of thumb certain specific results. After all, teaching is dealing with souls, and only mind can

really influence mind. The true and effective way to train the practical teacher is to imbue him with broad and fruitful principles; and he becomes a real educative force just in the degree to which, having incorporated those principles in the living texture of his own thought, he brings them to bear on the living problems which every day in school sets him to solve in such vast numbers. But that the principles and methods here set forth are practical has been proved by the successful working of every one of them in school.

At the same time I do not claim to have reflected here the ordinary practice of the average English school. To have done so would have furnished little of either stimulus or suggestion. I have set up an ideal, but it is a practicable ideal. It is true that small and insufficiently staffed schools cannot attain the full scope of the application here suggested of the leading principles. If they could, the book would be of little service to the larger and better equipped schools. But the principles of curriculum and of method can be applied to small schools as well as to large ones, and it is the principles which are essential.

The lists of recommended books have been deliberately kept short, and restricted to books known by the writers of the various chapters to be of real help to a teacher.

Acting on the opinion more than once expressed in the book that a teacher cannot be really proficient in every subject, I have not attempted to write all the following chapters. I have sought the assistance of friends and former pupils whose views on education agree with my own, and who are more competent to treat their respective subjects than I can claim to be. The chapter on Music is written by Mr. R. T. White, Mus.Doc., Lecturer on the subject in the Goldsmiths' College; those on Geography and Mathematics by Mr. W. P. Welpton, B.Sc., Assistant

Lecturer on Education in the University of Leeds; that on Natural History by Mr. C. E. Moss, M.Sc., Lecturer on the subject at the Manchester Pupil Teachers' College; that on Needlework by Miss E. L. Melville, M.A., Assistant Mistress of Method in the University of Leeds. The chapter on Geography also owes much to Mr. A. Jowett, M.Sc., Principal of the Pupil Teachers' College at Bury, and the sections on Handicraft to Mr. C. R. Stancliffe, Lecturer on the subject in the York Training College. But though the pens are different, the doctrine is one, and I accept as full responsibility for the chapters contributed by others as for those I have written myself.

I must further express my obligations to my friends—Dr. Fletcher, Vice-Principal of the Cambridge University Day Training College, for reading the proofs of all the earlier chapters, and Mr. B. Branford, Inspector of Secondary Schools under the London County Council, for reading those of the chapter on Mathematics. But above all, I owe a debt of gratitude to Mr. Welpton, whose suggestions and criticisms have helped much in every part of the work.

The last thirty years of the nineteenth century saw effort concentrated on supplying the material deficiencies in English schools. The few years which have already elapsed in the present century have been marked by a movement towards a wider curriculum and more effective methods of teaching. If this book—the outcome of years of thought and of much experience in the work of schoolroom and training college—helps that movement even to a small extent, the labour bestowed on it will be amply rewarded.

J. W.

LEEDS,
August, 1906.

CONTENTS.

CHAPTER I.

GENERAL FUNCTION OF TEACHING.

CHAPTER II.

MATERIAL OF INSTRUCTION.

CHAPTER III.

FORM OF INSTRUCTION.

CHAPTER IV.

THE TEACHING OF ENGLISH: PREPARATORY.

CHAPTER V.

THE TEACHING OF ENGLISH: READING.

CHAPTER VI.

THE TEACHING OF ENGLISH : LITERATURE.

CHAPTER VII.

THE TEACHING OF ENGLISH: COMPOSITION AND GRAMMAR.

CHAPTER VIII.

THE TEACHING OF ENGLISH : SUMMARY.

CHAPTER IX.

THE TEACHING OF MUSIC.

CHAPTER X.

THE TEACHING OF HISTORY.

CHAPTER XI.

THE TEACHING OF GEOGRAPHY.

CHAPTER XII.

THE TEACHING OF NATURAL HISTORY.

CHAPTER XIII.

THE TEACHING OF MATHEMATICS.

CHAPTER XIV.

THE TEACHING OF FORM.

CHAPTER XV.

THE TEACHING OF NEEDLEWORK.

CHAPTER I.

GENERAL FUNCTION OF TEACHING.

Recognised Importance of Education.

1. One of the most remarkable movements of the last century has been the increased importance attached in the public mind to education. Large sums are expended by the State and by local authorities in supplying and maintaining schools, and in securing the services of competent teachers. Old-fashioned people, indeed, are apt to grumble as expenditure on the machinery of education grows yearly heavier, but such grumblings become more and more infrequent as the new fashion of thought spreads, and those who are not converted at least hold their peace or give vent to their dissatisfaction only in private.

Meanwhile, a growing tendency is observable in the public press and on public platforms to regard education as a panacea for all social and economic ills. If our markets seem to be endangered by the enterprise of a foreign nation, it is pointed out that the nation in question has a system of technical schools and colleges more complete and better organised than our own. If we are not as immediately successful in war as patriotism would desire, Cassandra voices are heard on every hand warning us that everywhere amongst us are to be seen signs of physical

deterioration, and calling for compulsory systems of drill and other forms of physical training, and often for the public feeding of the children, to enable them to profit both by this and by what is more commonly understood by 'schooling.'

As the demand for the spread of the franchise becomes more and more irresistible, fears arise lest the newly enfranchised voters should use their power unwisely, and statesmen feel the need "to educate our masters." In these and other ways the fashionable creed is brought home to us, that socially and politically education is the one thing needful.

Doubt as to Function of Education.

2. But despite all this current enthusiasm and still more current eloquence, there seems to be no clear insight into the nature of this supreme good which all agree in demanding. It is as true now-a-days as it was in the time of Aristotle that "there is no agreement as to what the young should learn, either with a view to the production of goodness or the best life, nor is it settled whether education ought to be directed mainly to the culture of the intellect or to the development of character. Nor is the perplexity removed by an examination of the actual education we see around us, for there is no certainty whether education should be a training in what is merely useful as a means of livelihood, or in what tends to promote goodness, or in the disciplinary studies. Each of these views has some supporters. Further, even amongst those who accept goodness and character as the end there is no agreement as to the right means to adopt. For at the very outset there is a difference of opinion as to what kind of goodness is most worthy of esteem, and, as a natural consequence, as to the nature of the training necessary for its development."[1]

[1] *Politics*, v. 1.

Need to Resolve this Doubt.

3. Amidst all the current confusion there runs indeed the vague and general notion that education should be, in some way, a preparation for life, or, as Mr. H. Spencer puts it, "for complete living." Such a statement wins acceptance by its very vagueness and generality, but it is obviously inadequate as a guide to those who are to undertake in any special way the actual work of education, and who wish to set about that work not in a mechanical manner, ruled by mere tradition, but as intelligent "artists in the souls of children." They feel it needful to be able to give definite and well-grounded answers to such questions as, What is the aim of education? What do we wish to accomplish when we deliberately set ourselves to mould and direct the lives of the young? Why does the State enforce schooling and pay so heavy a price to have its children brought under school influence? What has the community a right to expect as the result of its sacrifices and regulations? What should parents require the school to do for their children?

Such inquiries will be taken by many people to be equivalent to each other, for modern habits of speech tend more and more to limit education to schooling. But in reality they are manifold, and involve the relations of home, school, and State as instruments of education, as well as the more fundamental question of the nature of the end which all their efforts are bent to realise. It is with this more fundamental question we are now concerned.

Application of term 'Education.'

4. What then is the aim of education, and what shall be included under the term? In a sense, everything which helps to mould and form a human life is part of its education. In this widest application physical influences, such as climate and material surroundings, are agents of

education, as well as everything in the social environment. Who can deny the formative influence of city or country life, of social position, of wealth or poverty, of refinement or coarseness? Everything which comes into one's life influences it to a greater or less extent, though in many cases, of course, the influence is too slight to be traced.

It is not, however, usual to speak of every formative influence as educative, and it will be necessary for our purpose to limit the term to influences which are intentionally brought to bear upon the individual by those who are in a position superior in some respects to his own. Even so it will be seen that the scope of the term is a wide one and will include not only the efforts of the school, but those of the home—indefinite and semi-conscious as these often are—and the regulation of life by the State and by the narrower social community in which the individual's life is passed, which by example, precept, and in the last resort compulsion, enforce their views of life and conduct upon their members. Nor must we omit the potent influence of the Church, including under that name every specially religious organisation. The degrees in which the moulding of the individual by these agencies is intentional of course varies enormously both as a whole and in detail. But wherever any element of intention is present the influence should be regarded as educative.

Aim of Education.

5. It is evident that education as thus defined will include influences good, bad, and indifferent. For some of those thus accepted as educators may deliberately exert an evil influence and of set purpose train and incite to wrong, whilst a much larger number will do ill even though meaning to do well, either from a misapprehension of what is really good, or from want of power to organise and direct the means to

the attainment of the perceived good. Hence we are led back to the root question: At what should education aim? and then to the dependent query: By what organisation of means can it attain its end?

Now to the former of these two inquiries many answers have been given and are still given. But they all fall under two general classes—the individualistic and the social. Those who look upon education as primarily, if not exclusively, for the benefit of the individual to be educated, give as their answer some form of preparation for adult life which will make that individual life a more desirable one than it would otherwise be. According to their view of what makes life desirable they lay most stress on the development of goodness, on the training of intellectual power, or on the acquirement of some form of aptitude which will be of direct service in earning a livelihood. And obviously the social position and degree of culture of the parents will largely determine which of these is regarded by them as the most important. Similarly, the State and the smaller local communities are apt to regard each of these ends as most appropriate to a certain social class and most desirable for the members of that class.

On the other hand those who look upon education as primarily for the good of the State, or of the community, will give as their answer that it should render those who are educated more fitted to perform well some function in the community, should discover what specific function each individual is best fitted to fulfil, and should train him for that. Here, too, emphasis may be laid on goodness, intellect, or industrial skill as the most valuable in general or for certain classes of the community.

Thus the results of the two answers may concide to a large extent in the community as a whole. But whilst the

former regards the social organisation mainly as a means for the advancement of the individual, the latter cares nothing for the individual as such, and only requires that the work of the community shall be well done. Whilst, for example, the former would found scholarships and set up "the ladder from the elementary school to the university," the latter would care little or nothing for such aids to the talents of the poor. So long as a sufficient number of citizens were found able to fill efficiently the higher walks of intellectual, social, and industrial life, the cost of whose training could be borne by their families, the community as a whole would not feel called upon to seek out yet others to train for similar pursuits at the general cost. Its aim would rather be to limit the number of those trained for the higher and more intellectual occupations by the number of probable vacancies in such pursuits.

Each of these views can be traced in the past. In its crudest form education consisted in training the child in the pursuits—hunting, fishing, fighting, etc.—necessary to enable him to maintain himself and his family when he should reach adult life. As occupations became more specialised this training took the general form of teaching the boy the craft or trade of his father and the girl the household duties performed by the mother.

But as communities became more organised the conception of the child as the future citizen became dominant, and, as a consequence, the idea that education is intended to train loyal and useful citizens overshadowed the conception that it is a means of benefiting the individual. This idea was carried out most fully in Sparta, where the family was practically abolished and the State took the training of its young citizens entirely into its own hands. Both Plato and Aristotle were much influenced by this view, but they raised it to a higher level by regarding the

whole organisation of the State as a means for the perfect development of the citizen as well as the education of the individual as a means to the perfection of the State. Thus in these philosophers we find a nice balancing of the claims of individual and community.

In the mediaeval Church the social view was predominant. Education was regarded as a means of training good Christians who would be citizens of the Kingdom of Heaven. Nevertheless, in that it substituted the spiritual for the temporal world it of necessity concerned itself with the personal or individual side of life. But at the same time its method of education was admirably adapted to train up a body of men who would continue its organisation and prosecute its aims.

Concurrently with this ecclesiastical system of education, with its strongly marked social tone, was that of chivalry, in which the sons of a favoured few were trained in the castles of the nobles. This was essentially individualistic in its conception: it aimed at making the perfect knight, whose characteristic virtues of courage and courtesy were essentially personal.

It must be noted, however, that in the ideal State of Plato, and in mediaeval society, formal and systematic education, whether ecclesiastical or baronial, was essentially aristocratic in its conception. It was reserved for the select few, whilst the vast many continued to receive only the practical family and industrial training of earlier ages. With an ignorant and debased peasantry such an education was all too often imperfect industrially and bad intellectually and morally. It was the special work of the nineteenth century, under the influence of Pestalozzi in Switzerland, of Bell and Lancaster in England, and of others of like sympathies, to promote a more definite and intentional training of the children of the poor, and, as a

necessary means, to advocate the establishment and organisation of schools by the State. But the very success of their efforts, by enormously increasing the number of children receiving schooling, naturally led to the gradual weakening of the social idea of the purpose of education and the corresponding increase in strength of the opinion that it is primarily an individual benefit. For in a modern State the numbers are too large, and the social and industrial organisation is too complex, for the State to attempt any apportionment of occupation in accordance with ability. And, further, the advantage to the State of the education of any particular individual is not obvious. The current individualistic philosophy of the eighteenth and early nineteenth centuries made for the same results, so that the individualistic conception is probably now the more prevalent.

Such a conception errs rather negatively than positively. For a child is a human being, and as such he is essentially an individual. But modern thought is more and more tending to emphasise that every individual is what he is through his interaction with his surroundings, physical and social. As a social being he enters into all sorts of relations with other human beings, and with the world in general, and as he grows older the range and scope of these relations increase. Cut away the social side of a person and the individual is reduced to an empty nothing. His development and success in life depend upon the fulness and wisdom with which he enters into suitable relations with the world in which he finds himself. To do this implies that he understands these relations and can interpret them liberally and generously. Only by understanding, for example, the relations of the physical world to his purposes can he avail himself of physical means. Every discovery in the mechanical arts is an illustration of

this. Understanding the power and activity of steam and seeing how to contrive by certain forms of arranging matter to utilise this power enabled man to invent the steam-engine. Similarly, only by understanding the relations of the social world and unifying his actions with those relations can one secure the direct or indirect co-operation of his fellows. It is needless to labour the point, which seems sufficiently obvious. Only by grasping clearly that life is a system of relations, and that every such relation has, as its two terms, the individual on the one hand and on the other some portion of the physical or human world about him, can we harmonise the claims of individual and social considerations to determine life, and consequently to be operative in our conception of the purpose of education.

Governed by this conception, we shall say that the purpose of education should be to lead the child into the fullest, truest, noblest, and most fruitful relations of which he is capable with the world in which he lives.

Knowledge and Practice.

Such relations may be broadly classified as theoretical and practical—those of knowledge and those of action. The distinction between knowing and doing is frequently drawn somewhat rigidly in modern thought, with the result that their mutual dependence is overlooked, and theory and practice are set in antithesis to each other. This is a result of the predominantly intellectual cast of philosophic thought for the last two centuries. Its consequences in education are serious—knowledge is often confounded with erudition, and practice with rule-of-thumb aptitude. In old Greek thought the distinction was not exaggerated into a separation. With Socrates, knowledge was the power by which things are done, and included not only the understanding how to do them, but the skill to apply that

understanding. Happily, thinkers are again seeing that this is the truer view of actual human life. Knowledge is the power of dealing effectively with situations, and is not complete unless the 'how' is added to the 'why.' As Guyau puts it: "To know is to be led as a whole to learn more and to be able to do more."[1]

Of course the 'situation' may be theoretical or practical. Every moment of one's waking and conscious life finds one in a situation requiring to be dealt with by some form of mental or physical activity. Experience, indeed, is nothing but a series of situations and the dealing with them. Thus, one may deal with a situation by deciding on a line of conduct and then steadfastly carrying it out; by inventing some machine or applying some material aptitude; by understanding the nature and cause of natural phenomena; by appreciating references to history or to literature; by entering into the spirit of a work of art. But whatever the situation may be, the power of dealing with it effectively includes not only a set of ideas which, as it were, reflect its nature, but also a system of ideas of the kind of activity which will enable us to extract from it all the advantage it is capable of yielding. Without this there is no effective knowledge.

When this fuller view of knowledge is taken, the dispute whether 'knowledge' or 'skill' should be the result aimed at in education is seen to be settled. To make either the sole aim is to render it impossible that even the half aimed at should be attained. Man's knowledge began in his practical needs, and every advance in knowledge has a practical bearing on life, either on the material or on the mental side. To enter into any piece of knowledge is to apprehend this bearing, and such apprehension can only result from the actual working it out in practice.

[1] *Education and Heredity*, p. 286.

Knowledge and Virtue.

Moreover, the answer to the question whether knowledge or virtue is the ultimate end of education is made easier. The highest knowledge is knowledge of how to deal with life itself, as distinct from its trappings and accessories. Such knowledge the Greeks called 'Wisdom,' and Wisdom they placed first of the cardinal virtues, the others being those qualities which enable a man to carry out without flinching, and with due regard to the rights of others, a line of conduct seen to be wise. At the same time, as has been said, knowledge included practice, and so might broadly be spoken of as covering the more obviously active qualities of the will, as well as those more contemplative attributes of the intellect which 'knowledge' or 'wisdom' more directly suggests. So we see what Socrates meant by his identification of knowledge and virtue. For knowledge or wisdom was not something merely existing in the mind, but was the actual dealing with the important things of life in a masterly way. And this implied persistence and effort, or, as we should say, 'Will.' Now the term 'virtue' to the Greek denoted the characteristic excellence of anything said to possess it. So that human virtue was excellence in living a human life in every one of its relations. Hence, virtue and knowledge approach so near each other as to be practically indistinguishable.

It is equally evident, however, that this identification cannot be made if the narrower and more popular meanings be given to 'virtue' and 'knowledge' and 'practice.' Hence we have the disputes already referred to as to which of these is the ultimate aim of education. On the view we have taken each by itself is inadequate. To say that "Morality is the aim of education," or that "The aim of education is the development of a good character," is either to limit the scope of education, or to extend the meaning of

'morality' and 'good character' beyond the usual modern acceptation. Yet more unfortunate is it to make the aim of education the acquirement of 'knowledge' in the very common modern sense of remembered information, for that is to divorce the educative process from the largest and most important parts of the life for which it has to prepare. Lastly, to make mere unintelligent practice the aim is to reduce man to a piece of machinery and to negate all the higher parts of his nature.

This is well put by Mr. Dodwell in an article on 'Matthew Arnold as a Social Reformer.' He says: "It is of course a very ancient truism that a just morality is the basis of all healthy social life. But the true ethical ideal can only be conceived by the man of well-balanced, well-developed mind; the true morality can therefore only be fitly conceived of, and indeed practised, by a mind whose aims are other than purely moral. To a lofty conception of conduct must be added the love of beauty, the love of knowledge, the love of social life; for we can agree to take as our ideal neither the hermit's, because we believe that man may find a higher life in society than in the desert; nor the ideal of the ignorant and uninstructed, because the intellect and its products are the most truly characteristic of man's power and works; nor the ideal of the Philistine, because civilisation, that quality which separates us from the savage, lies so greatly in the educated sense of beauty in all its possible forms. It is essential that all these should be in mutual subordination: our sense of beauty and good manners must not lead us into unworthy actions; and our sense of right, also, must be so subtly tempered as never to produce unlovely deeds."[1]

Or, as Lord Avebury briefly sums it up: "There are

[1] *Macmillan's Magazine*, Nov. 1905, pp. 57-8.

three great questions which in life we have over and over again to answer. Is it right or wrong? Is is true or false? Is it beautiful or ugly? Our education ought to help us to answer these questions."[1]

The Socratic 'Wisdom' or 'Virtue' will, perhaps, better than any other single term, cover the complex network of relations into which true education should lead the child. As the child is led into this wisdom he is gradually enabled to understand his environment, is made acquainted with the typical relations of life, and is inspired with clear and generous ideas about them; he becomes capable of entering sympathetically into the thoughts, and aspirations, and activities of his fellow-men, both as individuals and as smaller or larger communities; he reaches understanding of the physical world, and appreciation of its forms of beauty. And in this ever-widening process his own individuality grows and develops: his powers are realised only as they are exercised on appropriate material. Thus the development of his relations to his surroundings is the development of his own personality. And this development is possible only through his own activity. He himself must organise and systematise his ideas so that they are in true relation to each other and to the life which he has to live, and may issue in the appropriate expressive activity, mental or physical. In a word, the aim of education should be the attainment of that masterly power of dealing with life, and of appreciating at their true value the things of life, which Socrates called 'Wisdom.' This, in more modern phraseology, may be styled the development of personality.

6. Education, in the sense in which we have now defined it, is obviously not confined to school-life nor even to youth. Throughout life, Church, State, Civic Community,

[1] *The Use of Life*, Chap. VI.

and Social Organisation exercise their pressure and give their instruction by example, precept, or understood convention. The limit of the educative process is only reached when the individual becomes incapable of further modification or development. No doubt, as age advances one's plasticity decreases, but it would be hard to prove when, in any individual case, it absolutely ceases.

Chief Agents of Education.

Another educative influence is the vocation or employment by which one earns a livelihood. In youth or early manhood, after school days are past and when the directive influence of home is lessened, the chief educative influence in most lives is the deliberate teaching of a profession, craft, or trade. For here we have one whole set of relations, hitherto left vague and indeterminate, given a definite direction and character.

During childhood, however, the essentially educative agencies are the Home, the School, and the Church.

The Home.

In the earliest years the home stands alone. In it the child learns many bodily aptitudes and forms many habits of conduct. He learns to talk and to understand speech, and in so learning he imbibes many of the thoughts and opinions of the family, and, all unconsciously, adopts the general attitude of life therein prevalent. He enters into many of the simpler social relationships, especially those of obedience to parents and of courtesy and consideration for others, if the home be good, and their opposites of roughness and selfishness if it be bad. Throughout youth this influence of the home continues to be consciously exerted, though with gradually but constantly diminishing directive force; often it lasts far into life. And though, doubtless, there are homes that are bad, a yet larger number which are careless, and many which are not remarkable for their wisdom, yet it cannot

be doubted that the educative influence of the home is, on the whole, a force making for righteousness in the community. No true view of education, certainly, can ignore the home, though such ignoring seems to be implied by the common identification of education with schooling. Education, if wise and continued throughout generations, may work a radical reformation in a social state which contains much evil, but to hope that mere schooling will do so, whilst the other agents of education remain unsatisfactory, is futile.

The School.

That the school is an educative agent is obvious to all. It sets itself ostensibly to train the young, and besides this it has no other justification. All the other educative agents we have named have other functions, and so their work as educators is apt to be overlooked. But it is not so with the school. For the work of the school is organised solely with this purpose. It is, therefore, the most typical—if not the most powerful—educative instrument.

If we consider the place of the school in the social organisation we shall see more clearly what part of the work of education especially falls to it. On the one hand it takes up the specialised function of instruction which the parents have neither time nor skill, and frequently not the knowledge, to impart. Specialised work is the characteristic of all advanced civilisation, and it is not surprising that as knowledge increased and life became more complex the need of specialists in teaching should be felt. The teacher in school, then, acts as the delegate of the parents in the work of teaching. This being so, it is evident that the educative process will only go on smoothly and well when home and school work in harmony with each other.

On the other hand the school is the organ through which

the State mainly brings its influence to bear on the young. Even when a school is not regulated by the State it interprets the laws and customs of the State to its pupils, and, of course, when there is State organisation and direction the relation is more intimate. The school has, therefore, to assist in carrying out the aims of the State in providing for the education of the young.

The school thus stands as the intermediary and reconciling ground between the private and individual claims of the family and the social claims of the State. It is this even to its scholars. For in the wider community of the school they enter into relations different from those in the family, and yet simpler and more limited in scope than those that await them in the world.

The Church.

The educative influence of the Church is, in childhood and early youth, mainly exercised indirectly through the home and the school, and so far as it is exercised directly it is by example and teaching, and does not in this differ materially from the school.

Education and Life.

7. From even this brief discussion it has become manifest that it is an error to regard education only as a preparation for adult life, if such a view leads us to determine its means simply by a consideration of the requirements of that life. For life grows out of life, and child-life can only become full and fruitful when it finds expression in child-relations. From the home, through the school, the workshop, the social community, the child passes to the fuller relations involved in the State and in the Church, and it is only as he has participated fully in the former that he can profitably enter into the latter.

8. A full treatment of the theory of education would, then, cover a very wide ground. Our purpose in this book

is, as its title indicates, much more limited. We deal with but one factor in education. But it was necessary to set forth at the beginning the other and perhaps more important factors, in order that the true function of this one may be appreciated. We confine ourselves, first, to the school, as the typical teaching institution. Then we further limit our outlook to the work of teaching, omitting those more important means of education which are involved in the school as a systematically organised social community, including its tone or general moral atmosphere, its government and discipline, and that potent influence, the personality of the teacher. We treat of teaching by itself, because it is an aspect of school life which can be singled out in thought, though it cannot be separated in reality from the whole of which it forms a part, and because it covers a fairly consistent body of doctrine. It is true the value and success of all school teaching depend on those wider and deeper elements of school life—tone, discipline, etc.—which we are omitting. But it is also true that whilst the latter may be excellent the former may be of poor quality, and also, though in a much less degree, that teaching good in conception may accompany bad discipline and bad tone.

Education and Teaching.

9. Now in order that any work should be done really well it is plain that there must be a clear conception of the end or purpose to be attained and an intelligent adaptation of available means to the attainment of that end. This conception of end and means is what is meant by the theory of teaching. In other words, theory is practice become conscious of itself, and practice is realised theory. We have already seen that Socrates included both under knowledge; and modern custom retains to some

Theory and Practice in Teaching.

extent the same comprehensive meaning when it speaks of knowing how to do something which requires skill. And teaching is emphatically skilled work. It may be, and often is, done mechanically, but then the result is inferior; in other words, the children so treated suffer an irreparable wrong. The essence of mechanical work is that there is no special adaptation of means to end, often no clear conception of what end is really aimed at, but a mere rule of thumb following out of process which leaves off at a certain time but never finishes in the sense of completing a set work and attaining a set purpose. The mechanical teacher does as he was done by; with him progress implies change, and change is unwelcome, for he cannot adapt himself to it. So the weary tread-mill round goes on, and the school becomes less and less a satisfactory educative agent. For it brings its pupils into no living relations with the world, and the sterile and transitory relations it does establish take no account of the progress of events and the actual state of mankind. It abides in the traditions of the elders—traditions adapted it may be to the social state a few centuries ago, but quite unfitted to the changed conditions of the present.

The only escape, however, from mechanism in teaching is to be found in earnest reflection on the purpose and nature of teaching, and the results of such reflection is theory. Thus, a theory of teaching which deserves the name is in the closest possible touch with actual school work. It is not an unsubstantial vision spun out of the clouds of an untrammelled imagination, but it is the result of an analysis of the function of teaching, including its aim and the factors concerned in it.

10. We have agreed that teaching is one of the instruments of education, and that its special function is to

impart understanding and skill; in one word, knowledge, in the sense in which we prefer to use the term. Now in this process there are three chief factors—the child to be taught, the subject-matter by means of which he is to be taught, and the teacher who teaches him. A theory of teaching must bring these into effective union. Of the three factors the teacher is evidently the intermediary between the other two. He largely decides what the child shall learn in school, and in what way he shall learn it. But there his function ceases. The child must do his learning for himself if it is to be of any worth. In other words, those relations only are fruitful which the individual establishes for himself; knowledge is power only when it is attained by personal effort. Moreover, what the child learns has its own nature which the teacher cannot alter, though he may, by bad teaching, place a distorted vision of it before the child's mind. The material of learning must always be some part of the collective knowledge of mankind, and consequently must embody those relations which make knowledge what it is.

Factors in Teaching.

11. The teacher, then, must regard on the one hand the nature of the child to be taught, and on the other the nature of knowledge in general and of the special piece of knowledge to be imparted in particular. This is what is meant when it is said that the theory of teaching rests both on psychology and on logic. For knowledge of the modes of mental life of those to be taught is psychological knowledge, which a study of systematic psychology may help us to attain but cannot give us. Such knowledge can be reached only at first hand, by sympathetic study of the children we have to teach. Mere psychological insight, however, will not make teaching effective. For children's minds often work

Function of the Teacher.

inaccurately, and are, moreover, apt to rest satisfied with very imperfectly attained results. Hence, teaching must set forth the material of knowledge in such a form that its true inherent relations may be grasped and that the dependence of part upon part may be made explicit. This is what we mean by the application of logic to teaching. All teaching is logical which sets forth true relations within the matter of knowledge.

There is, of course, no opposition between these two sets of principles. Our inquiry is psychological when we ask how a mind *does work* in its attempts to deal with the world. The answer often shows that it so works that it attains false results, as, for example, in the explanations of natural phenomena given by the superstitious mythologies of savages. When we then go on to ask how the mind *should work* to attain truth, the inquiry becomes a logical one. When an opposition is set up between a 'psychological method' of teaching and a 'logical' one, the term 'logical' is confined—in flagrant opposition to current logical doctrine—to deduction. For the last sixty years at least logic has protested against any such limitation. In brief, every piece of teaching which arouses any mental process at all in a pupil is psychological, and every piece of teaching which leads a pupil towards truth is logical.

When a teacher prepares a piece of teaching he has first to decide what relations he wishes to set before his pupils; then he has to solve the two psychological problems of what forms of mental activity those pupils must experience in order to master those relations, and of how they may be incited to put forth those forms of effort. In giving the lesson the teacher's attention is doubtless fixed mainly upon the last of these inquiries, but the other two must be firmly in his

consciousness in close union with each other, or the lesson will be a failure. The pupils, on the other hand, will have their attention concentrated on the logical relations; in other words, on the subject-matter of the lesson. Of the mental processes they are passing through and of the teacher's devices to prompt them to go through those processes they are, or should be, unconscious.

It is only when the teacher clearly appreciates the instrumental character of his work that teaching fulfils its true function of causing others to learn. And 'to learn' here implies power to do as well as power to understand: it means the attainment of knowledge in the sense already adopted of power to deal effectively with situations. We have in the following chapters to consider how the teacher's mediation between his pupils and the great world around them may be made effective.

CHAPTER II.

MATERIAL OF INSTRUCTION.

Meaning of 'Value.'

1. Nothing except the ultimate good is of value simply in and for itself. The value of all other of the things we esteem of worth is relative to some end which they tend to serve. And such end, again, is of value relatively to some wider end, and so on till we reach the highest good itself. There is thus a successive hierarchy of values beginning with the most trivial objects we esteem and leading up in a continuous network of streams to their culmination in the highest good for men as we judge it to be.

Relative Values of Education, School, and Teaching.

2. It thus appears that education itself has a relative value, the relation being to the kind of life we judge highest and noblest. Evidently, then, there is no such thing as an absolutely good education—that is one which would be of equal worth in every set of conditions. For with variations in the conception of the ideal of life there must of necessity be corresponding variations in the education which prepares for that life. As the end varies so must the means vary in relation to it.

If this is true of the whole content of education, it is still more true of the agents of education. The functions of the State, the family, and the school are directly related to the whole process of education, and indirectly and through that to the conception of the end of life. Hence, the test of the value of any school is the degree to which it fulfils its function in the whole educative process. And as various schools differ in function, so the application of such a test will be various.

In the third degree of relative value we have the instruments which the school uses to secure its object—broadly, instruction and discipline. The value, then, of school instruction is directly relative to our idea of the ends the school has to serve, and through that indirectly relative to our conception of the work of education as a whole, and through that again to our conception of the ultimate meaning and purpose of human life. In other words, the value of the school is itself relative, and that of all school instruments relative in a lower degree.

Evils of exaggerating Functions of School and of Teaching.

3. If this be borne in mind there will be no danger of our falling into the very common errors of exaggerating either the function of the school as a whole by regarding it as the only educative community, or that of instruction by thinking of it as the sole educative instrument the school employs. Such exaggerations are not only theoretically unfortunate; they frequently entail undesirable practical consequences. The pedagogical arrogance which is the natural outcome of the view that the school is the only serious educative institution is both a cause and a symptom of a dislocation between the school and the world outside in general, and the family in particular, the effects of which on the whole process of education are disastrous. The theoretical ignoring by the

teacher of moulding influences outside the school does not put those influences out of existence, but it does lead to much waste of effort and to grievous disappointment at the contrast between the results achieved and those which the theory that the school is all in all in education would lead one to expect.

Similarly, the exaggerated importance often given to instruction in school education tends to the substitution of the means for the end, and to making the acquirement of information the ostensible end of school work. This at bottom means the setting up of external success as the main if not the only aim of effort. In this way the whole influence of the school is thrown, often unintentionally, on the side of a narrowly materialistic view of life. Concurrently with this exaggeration and proportionate to it, we have a neglect of all forms of social life in the school, especially of school games, and a tendency to regard drill and gymnastics as furnishing a sufficient physical training.

Test of Educational Value of Instruction.

4. If, then, we grasp the truth that any piece of instruction has but a limited effect on the total life of our pupils, we shall be all the more desirous that none of our efforts in teaching shall be either wasted or misdirected. Misdirection of effort is, indeed, worse than waste, for in the latter case the effect is merely zero, but in the former it is a negative quantity relatively to our aim. Hence, relatively to the work of education, the question of the value of the instruction given is of vast importance. This question arises in three main aspects of instruction. First, as to those broad factors of the course of study known as 'subjects.' Secondly, as to the actual content of those factors. It is obviously not enough to decide that a certain subject, say history, shall be taught. The actual value of

that subject as an instrument of education will depend upon what parts of it we teach. Thirdly, it will depend also upon how it is taught, whether in such a way that it becomes mere mental lumber or in such that it enters into the very texture of life itself.

It is seen, then, that the decision of this question of the value of the different parts of the school curriculum is dominated by the conclusion arrived at with regard to the aim of the school work as a whole. We have decided this to be, in the most general terms, to bring the pupils as far as possible into good, true, and effective relations with the world of which they are constituents. If we analyse this idea we find that it covers

(*a*) preparation for the utilitarian life of earning a living,
(*b*) preparation for social life in all its forms,
(*c*) preparation for the private life of cultured leisure.

On the subjective side this means a development of the inner capacities with reference to these ends; for such development is the one essential condition of the 'preparation' spoken of in each case. Now, according to our view of the life our pupils lead in the present and are likely to lead in the future we shall emphasise the relative importance of one or other of these great departments, and we shall call that development of capacity a harmonious one which observes these relations of emphasis.

Evils of applying imperfect Tests.

5. Such a broad statement of the test of value covers and includes all that is true in the current tests of educational value, viz., as Spencer puts it, "value as knowledge and value as discipline." At the same time it prevents exaggeration on the one side or on the other if it is fully and consistently applied, for it should prevent us from considering any

piece of teaching exclusively from either of these abstract points of view—abstract in that in all real learning there is both content, or some knowledge acquired, and discipline, or mental exercise in the attainment of that knowledge.

'Value as Discipline.'

Of these two abstractions the latter has generally been the favourite of the professional educator, and the former that of the man in the street—the unprofessional educator. He is anxious about *what* his son learns and cares little for the *how*, whilst the teacher naturally tends to emphasise the 'how' at the expense of the 'what,' for the 'how' is the distinctive mark of his craft. So we hear much of the disciplinary value of mathematics or of classics in that they train the 'faculties' of reasoning and judgment, of the aim of object-lessons as a training of the observation, and of practice in 'design' as a development of the imagination.

Now, if taken narrowly enough, such statements are true. But the usual implication is that there is attained through such means a general development of the faculty in question. But this is not so. Every such 'faculty' is merely a mental habit and it is no more possible to develop, for example, a memory in general than it is to develop a habit of movement in general. We can develop a memory for words, figures, forms, etc., but we can do no more. Moreover, mere facility of memory is not its most important feature: tenacity and power of selection and systematisation are still more desirable qualities. And these imply that habits of memory are not formed separately by exercises devoted to that end alone, but are developed as part of the regular activity of mind in gaining knowledge. Similar remarks hold true of training the observation, training the imagination, and so on. All such 'faculties' must be developed as essential factors in a healthy mental

life; but if the attempt is made to develop them in isolation the result is merely the formation of certain narrow mental habits.

Further, the setting up of this 'training of faculty' as our immediate aim is apt to make us forget its really instrumental character, and then we seek evidence of our success in an immediate outcome of the 'faculty' we have been cultivating. So we gauge the worth of our teaching by a pupil's easy reproduction of a number of statements of facts he has 'learnt,' by his power to dissect a flower, by the facility with which he produces a 'design.' But we too often forget to ask whether the child who dissects the flower has also learnt to love and admire its beauty, or whether the pupil who makes a design is also developing a sense of fitness and appropriateness to purpose as well as a feeling for symmetry. There is, indeed, no necessary antagonism between such results in the child's mind, but the latter kind of results are only likely to be striven for consciously by the teacher who thinks of the value of his teaching in terms of the concrete life of the pupils, and not in terms of abstract faculty training.

Further, a doctrine of abstract faculty training is likely to lead in practice to a substitution of trivial erudition for real valuable mental activity; for such 'faculty training' is most obviously carried out by preponderant attention to details, especially with the lower faculties of observation and memory. It, moreover, tends to a mode of teaching which defeats its own ends—viz. an excessive use of that form of oral teaching in which the teacher guides and leads the pupil's thoughts from one detail to another, so persistently that no serious effort is required to follow him, and so minutely that nothing but details are attended to; hence these remain separate and fail to enter really into the structure of knowledge.

In the next place, the doctrine of the 'training of faculty' makes no effort to evaluate the faculties or to determine their true part in the concrete mental life. Hence, now one faculty and now another becomes fashionable. A century ago it was the memory, afterwards the reason and understanding; now-a-days it is the observation to the training of which enthusiastic reformers beg us to direct our supreme efforts. It is only from an analysis of the main relations of the individual to his world, in view of a definite conception of the ultimate purpose of his life, that there comes an evaluation which makes it clear that in the last resort intellectual power is valuable as auxiliary to what in the broadest sense of the word we call 'moral' functions, and that aesthetic discrimination plays also a subordinate part, though one superior on the whole to the merely intellectual in that instinctive goodness is rather of an aesthetic than of an intellectual character.

Lastly, the doctrine of faculty training exaggerates the importance of the mode of teaching over the matter taught. In its most extreme form it has been stated that "it does not matter what you teach: the important thing is how you teach it." This would seem to imply that no influence is exerted by the environment, and that therefore it does not matter in what mental environment a child is placed so long as he is active in relation to it. It is assumed that the capacity for acting can be divorced from everything which makes it a real activity; that habit is a tendency to do irrespective of what is done. But all this is at hopeless variance with fact.

'Value as Knowledge.'

On the other hand, to take the second abstraction 'value as knowledge' as our test leads to equally undesirable corollaries. There is, first, a tendency to limit 'knowledge' to information about facts, statements of which can be committed to

memory. Secondly, a further tendency to restrict such 'knowledge' to what is likely to be immediately useful in industrial or professional life. Thirdly, a tendency to overestimate the amount of such 'knowledge' which an individual can assimilate. Fourthly, a tendency to attach too little importance to the manner in which the knowledge is acquired. Fifthly, a tendency to estimate the result of the teaching by the amount of 'knowledge' acquired rather than by its nature. And sixthly, a tendency to confuse the power to talk about a thing with real knowledge of it.

These tendencies play into each other, and their general outcome is the worship of examinations, and the setting up of success in examinations as the real, if not the ostensible, aim of the school. The result on the pupils is generally disastrous. Nothing fatigues the brain so much as an attempt to acquire a large number of unsystematised facts, often of no importance in themselves and whose bearing on life and purpose is far from obvious. Hence arise in the pupil disgust and a distaste for all intellectual pursuits, and as a result no attempt is made by him to render the knowledge acquired a permanent possession throughout life. Further, there ensues a cultivated habit of attending almost or quite exclusively to details in every matter, and an inability to see the general bearings of things.

These Values not necessarily Connected.

Neither 'value as discipline' nor 'value as knowledge' is, therefore, a sufficient test of educational value. Nor can we assume, as Mr. Spencer does, that the two will always coincide. Practical skill comes with practice, and theoretical considerations are out of place in its application. To think, for example, of the mechanism of any movement whilst making it would interfere with the execution of the movement, which is perfect in proportion

as it has become automatic. It is, therefore, by no means always true that the 'subjects' which offer the best gymnastic of the mind are always those which can be most directly applied in practical life; still less that the mental attitude towards them is the same. These values are not identical; each is a factor in the fuller test we have suggested.

General application of Test to School Work.

6. Though we have analysed the relations of the individual to his world into utilitarian, social, and those which express individual culture, yet it must be borne in mind both that these are mere abstractions if taken separately, and that, as the school is not the only educative agency, it may well be that it deals directly with some only of these aspects of life. Now, it is evident that many of the practical activities of life are best learned, and in many cases can only be learned, by the actual practice of them. This applies particularly to the special skill required in many individual trades and occupations, and, as a consequence, we can dismiss from consideration all such forms of knowledge as matter of instruction for the ordinary school. The knowledge required must be gained in actual workshops, whether those of ordinary trade or those connected with technical schools it does not, in this connection, matter. The same remark applies to certain social relations, as, for example, those of family life, which, so far as they are special modifications of general social relations, fall outside the purview of the general school.

It follows from these considerations—

(*a*) that the preparation for life given in the school is of a general rather than of a specific character;

(*b*) that such preparation should supply a basis for *any* kind of specialised effort later on, and must, therefore,

bring each pupil into relations with each of the great typical aspects of the world: hence, the curriculum must be a wide one;

(*c*) that to bring a mind into relation with any aspect of the world means to develop a system of ideas in connection with that aspect, of such a nature that they prompt to forms of activity designed to realise and develop them;

(*d*) but that, as the amount of such energy and activity possible to each individual is limited in amount, all waste of it should be avoided: in other words, only such knowledge should be presented as can be assimilated, and such knowledge should illumine as wide tracts of experience as possible.

Of a curriculum as a whole we, therefore, ask: Does it instil a large number of fruitful and generous ideas in connection with all the types of relations into which the pupils are brought in life, and does it so relate and organise those ideas that they are in true relation with each other and with the life the child has to lead? Similarly, of any special factor of the curriculum—whether 'subject' or part of subject—we ask: Is the matter calculated to bring the pupils into closer and truer relations with that particular part of their environment, and is it likely to do this in an inspiring way; that is, so as to promote a nobler and wider outlook on that aspect of life? If the answer is favourable, then the knowledge it is proposed to impart is both 'useful' in the true sense that it can be put to some worthy use in the pupils' lives, and 'disciplinary' in that it is such as will stimulate and occasion appropriate mental activity.

It is obvious that these questions asked of any one piece of knowledge would receive very different answers in varieties of circumstances due to the character of the

school and to the age of the pupils. We can, therefore, speak of no piece of knowledge as having an absolute educational value, or as being a universally important instrument of education.

Material Utility and the Curriculum.

But if, in answer to such questions, the only reason that can be given for teaching any subject or part of a subject is that it can be applied in the future to some directly practical and material end, or that it is meant as an 'accomplishment,' that is, some mere conventional ornament, then there is no justification for the teaching. There is neither time nor energy at disposal in school life for attaining knowledge which does not widen the outlook and develop those qualities of character which lead to the true fulfilment of function in life. This is what is meant by saying that every true school—be it secondary or primary—gives a 'liberal education.' For a liberal education deals with the necessary and the beautiful, and a competent dealing with them leaves no time for the narrowly utilitarian or the merely ornamental.

Examinations.

With at least equal force do such considerations apply when the 'directly practical end' is the passing an examination. So far as the selection of the matter of instruction is determined by this consideration, and the teaching is directed towards this end, the curriculum and the teaching cease to be essentially educative in intention. The true function of examinations is to test and to probe. Directly an examination is made regulative, the teacher who so accepts it delegates the determination of his curriculum to someone else, who, *ex hypothesi*, does not know the needs of the pupils as intimately as the teacher himself does. Of course, a curriculum thus externally determined may be a good one as a whole, but even then, in the circumstances

we are considering, it is most likely to be badly used; that is to say, the aim of the teacher, and consequently of the pupils, is likely to be the comparatively low one of external success. Moreover, such an externally devised curriculum generally imposes a certain fixed amount to be learnt in a certain limited time, and it will be fortunate indeed if this amount is so well adapted to the school that neither on the one hand is time wasted, nor on the other is there haste and scramble in the teaching in the attempt to accomplish the given task.

Further, as a matter of fact, examinations have hitherto shown a marked tendency to attach too much importance to memory of detail, and that detail very often both trivial and obscure. This leads to attention being focussed on these, and not only does this generate a bad mental habit in the pupils, but the curriculum becomes overcrowded; not because ideas are being developed in too many of the pupils' relations to the world, but because the development of such fruitful ideas is actually being hindered by the fixing of the attention on a vast number of 'facts,' between which the reason can establish no relations, and which, therefore, even when acquired, cannot go out beyond themselves; which are not, in a word, illuminating or fruitful, and which, consequently, can lead only to mental confusion and disgust. It is in this that we find the root of the great majority of children's 'howlers' which are periodically served up for the amusement of the thoughtless.

Special application of Test to different Types of Schools.

7. To lead its pupils into true relations with their world is, then, the work of every school in general, and of school instruction in particular. With us this means, at bottom, to help the pupils to find themselves at home in the English civilisation of the twentieth century as it is seen at its

best in that station of life in which they live. For the aim of education is not merely in the distant future of adult life. On the contrary it is immediate, and it is only by making the present life of its pupils as children a worthy one that the school can hope to prepare them for a future worthy life as adults.

All one's relations with one's world are both social and individual. As an individual each child has to become familiar with the thoughts, actions, and feelings of the people who surround him. These he can understand only in so far as he himself learns to think about similar things in a similar way, to evaluate experiences by a similar standard, and to adopt similar purposes. Of course, he is continually doing all this through conscious and unconscious imitation of those around him; he is learning their language, and in doing so is entering into the thoughts, feelings, desires, and purposes which that language expresses. The function of a school is to make clear, definite, and systematic this confused understanding of the life surrounding its pupils, and to do this in such a way that this life is not only entered into, but is made the stepping-stone to a higher, wiser, and nobler life. But the life from which all fruitful school instruction must start, and in which it must find its root, is always the actual life of its pupils.

Thus, it is obvious that the application of our general test would lead to different details of curriculum in different classes of schools, the main conditions of difference being the character of the actual life of the pupils, the age to which most of them remain at school, and the broad kind of industrial or professional life which the great majority may be expected to live. In every case the pupils should be led into relations with all the typical aspects of experience, but the detailed studies through which this is done must be specially determined in each case.

Speaking broadly, we may say that the problem will receive four main types of answer—that of the school which retains its pupils to the age of eighteen or nineteen and sends forward a considerable proportion of them to the universities; that of the school whose pupils leave at sixteen or seventeen years of age and then enter the subordinate walks of professional life or the higher grades of industrial life; that of the primary school whose pupils leave at about fourteen years of age and enter the lower ranks of various industrial occupations; and that of the infant school whose function it is to prepare its pupils for either the primary or the secondary school. Each of these answers requires separate and detailed elaboration, and an excellent answer to the problem in one case may be, or rather must be, a very poor answer in each of the others.

Limitation of Treatment to the Primary School.

In this book we limit ourselves to the answer which should be given in the case of the primary school whose pupils range in age from seven to fourteen years, and live in homes which are not, as a rule, marked by considerable culture and refinement. This last consideration, regrettable as it is, must be recognised as a factor which has a profound influence on the teaching, for it fixes our starting-point and it limits, both in this way and by its constant influence, the extent to which culture is possible.

Determination of the Curriculum of the Primary School.

8. When we consider in more detail what we mean by understanding and entering into the thoughts, feelings, and activities of the world around us, we find we must analyse those activities to find the objects on which they are exercised. We then see that thoughts are exercised either on men's lives or on the physical world; that feelings are called out mainly by the personal

relations of other men to ourselves or to those in whom we are interested, or by certain aspects of material things which we broadly classify as beautiful or ugly; and that activities are in close relation to thoughts and feelings, for they are inspired by purposes which we feel to be of value, and of which we can anticipate the realisation and plan the accomplishment. To know thoroughly the activities of the men of our generation would therefore include in itself all that it is possible to learn, for it would embrace all existing knowledge. Nothing can go beyond this except new discoveries which add to the sum of human knowledge, and, of course, such discoveries play no direct part in the life of the primary school. It is true that the school cannot set before itself as the aim of its instruction an attempt to cover all departments of human knowledge. But it must consider the broad nature of them all in order that no typical aspect of human experience or form of human activity may be omitted.

English Language.

Attempting this, we see that in order to enter into men's lives at all a knowledge of language is essential. The first function of the school is, then, the cultivation of language. In the primary school this is necessarily confined to the mother tongue. To help its pupils to understand, to speak and to write the mother tongue is, therefore, one of the school's most important tasks.

Literature, History, and Social Geography.

In the next place, we need to extend the pupils' knowledge of what men think and do far beyond the narrow confines of their individual lives, and the great means of such extension are literature, history, and that description of the lives of foreign peoples which may be called social geography. Some amount of ethical analysis of conduct will naturally find its place here.

In the third place, men think of the material world and adapt it to their needs. To enter into the life around him the pupil must, therefore, study the natural world, and the relations of natural objects and forces to each other. With pupils as young as those of the primary school this study cannot be very deep. The course of nature is too complex for a child of fourteen to be able to unravel much of it, but some general ideas of the meaning of nature and of the lives of plants and animals should be acquired.

The Natural World.

Of course, that important aspect of natural things which we call quantity must receive attention, so some elementary knowledge of mathematics will be included.

Mathematics.

Further, the aesthetic aspect of things must not be neglected. Nature offers much of beauty, and man has produced much more; and the influence of beauty is very real in the world of to-day, if, perhaps, less conspicuous than it has been in some past times. To train appreciation of beauty is, therefore, part of the work of the school. Indeed, in the case of the primary school it is a factor of the greatest importance, for in no sphere has the school to supplement the deficiencies of the home more than in this. Some cultivation of music and of at least one of the arts which aim at beauty in form should, therefore, enter into the curriculum.

Music, Drawing, etc.

Lastly, the pupils must get an insight by various manual occupations into the primary ways in which man adapts natural objects to the attainment of his purposes.

Handicraft.

These broad groups must be regarded as essential constituents of any worthy curriculum. But the filling

of each group, and the relative emphasis laid on each, may well vary from school to school. The out of school lives of the pupils would influence the choice. Thus, a town school would not have a curriculum identical with that of a rural school. In the latter some form of school gardening might occupy part of the time given to book learning in the former. For such a subject would not only be in more direct relation with the out of school lives of the pupils in the present, but would tend to develop in them tastes and aptitudes for the pursuit of which a country life furnished facilities. On the other hand, the public libraries in the towns present means for continuing literary culture which are absent in the country, whilst the opportunities for gardening are frequently small. This factor of choice involved in the likelihood of means for developing during leisure hours in the future a form of activity for which a taste has been acquired in the school is one much neglected, but none the less important.

Variations in Emphasis on Different Groups.

Similarly, a town school, whose pupils come from extremely poor and uncultured homes, might profitably devote a larger amount of time to various forms of handicraft than one whose pupils live amidst surroundings of a more intellectual character. For in this way the children would more easily see some value in schooling, and so would throw themselves into it more heartily. Nor must it be forgotten that appreciation of productive labour is the first step in civilisation.

A further cause of variation may be found in the enthusiasms and tastes of the teacher. Everyone teaches most effectively that which he knows and likes best, and hence it is quite legitimate for a teacher to prefer to put his own pet subject into the curriculum, provided it be

one of general interest, rather than some other in the same general group.

It is evident, then, that though the State or the local community has the right to demand that the schools through which its educative efforts are brought to bear on the children should adopt a curriculum of a certain broad and general character, yet the actual filling of the general scheme should be left to the teacher. In towns, at any rate, freedom of choice between schools with somewhat different courses of study would also leave scope for the satisfaction of varying aims and desires on the part of the parents. But when either the State or the local education authority imposes a rigid syllabus upon the schools under its care the liberty of both parents and teachers is unjustifiably curtailed, and in many cases a dead mechanism is substituted for a living and fruitful human activity.

Influence of Tradition.

Of course, every actual determination of a curriculum is largely influenced by school tradition. In this tradition we have the expression of the scholastic experience of the past, and we can judge its results both as to their actual value and as to their suitability to the conditions of the present. For it is only as conditions of life change that educative organisations and instruments which have been successful in the past need to be modified. Every good curriculum, therefore, takes up into itself all the elements of a traditional curriculum that have justified their inclusion, though in absorbing them it may modify them to a greater or less extent. In other words, school reform is always reformation, never revolution. It is not, therefore, surprising that the evolution of the course of study generally judged suitable to a primary school has in practice approached very near to the results to which we have been led by a

theoretical analysis of the main forms of relation to man and nature into which the school should try to lead its pupils. English Language and Literature, Music, History, Geography, Nature Knowledge, Mathematics, Art and Handicraft, are now commonly acknowledged to be essential constituents of a liberal primary education, and not alternatives, as they were regarded only a few years ago. To this result the mere development of tradition by experience might, however, have been long in coming had not the progress been accelerated by such theoretical considerations as those we have examined.

Yet the battle for a liberal education in the primary school is not altogether won. The 'subjects,' indeed, are generally included, but too often a wrong attitude of mind towards them is adopted by all concerned—by legislators, inspectors, teachers, and pupils. The old tradition that knowledge is erudition and is distinct from practice has in too many cases not been modified by the truer doctrine that real knowledge includes in itself effective practice. So, though the 'subjects' are taken in school lessons, they are treated in only one of their aspects: those which increase the store of ideas are regarded as serving that function only; those which involve practical aptitudes as training them only. But the curriculum, as we have outlined it, is not really adopted unless reception of idea and carrying out of idea always go hand in hand. In every instance in which this is not secured no effective relation is established between the pupil and that particular part of his physical or mental environment.

9. Such a curriculum as has been sketched must be acknowledged to make unduly heavy demands on the teacher if the same person is expected to teach effectively

all the subjects it includes. Indeed, we may go further and assert that such an expectation is nearly certainly doomed to disappointment. It is not that every teacher ought not to have some knowledge of each subject: that is involved in the claim that every scholar should study them, for the teacher is first a scholar. But this general knowledge is quite inadequate for stimulating and fruitful teaching. No one can do good educative work in any subject of which his knowledge is not copious, and for which he has not a real liking, if not an actual enthusiasm. And no one can have a stimulating enthusiasm for everything.

Utilisation of Special Knowledge of Teachers.

Unhappily, the tradition that every primary teacher should teach every subject taught in his class—a tradition dating from the time when the 'three R's' formed the whole curriculum—still holds sway in the majority of schools. As a result there prevails a grievously low estimate of the amount of pertinent and special knowledge which must be brought to bear on every lesson to make it effective. The inevitable result is the very common failure to awaken any real love of learning amongst the pupils. Nothing is more obvious to the thoughtful observer than that the teaching in a primary school will be wanting in effectiveness and success so long as the fullest use is not made of any special knowledge, enthusiasm, or aptitude which may exist among the members of its teaching staff.

Surely the time has come when it should be recognised that the ideal of knowledge for the English primary teacher is no longer to be "Jack of all trades and master of none." He should at least be master of *one*, and should have acquired such an appreciation of the true relation of knowledge to teaching as a mere smattering of many subjects can never give.

Arrangement of Matter of Instruction.

10. Having laid down the broad and general contents of a satisfactory scheme of primary study, we have next to consider the general principles on which the matter contained under these general heads should be arranged. Here we have obviously two inquiries—one as to the arrangement of subject-matter within each separate 'subject,' and the other as to the relation of the contents of one subject to those of another. The former is essentially a question of 'Method' and will be dealt with in the next chapter. The latter concerns us here. For it raises the question whether in choosing what we shall teach in any one subject we should be guided by considerations of what is being taught to the same pupils in other subjects, and if so to what extent.

'Concentration of Studies.'

On this point a doctrine, imported from Germany, seems to be becoming fashionable in books, if not in the schools themselves. It is known as 'Concentration of Studies,' and its main feature is that in every class one special subject should be chosen as the 'core' of instruction, and all other subjects should be grouped round it and brought into as obvious relations as possible with it. For example, a favourite 'core' for children about ten years of age is *Robinson Crusoe.* On this scheme the children would read the book, write composition exercises based upon it, sing songs about Crusoe's life, draw various objects mentioned in the book, connect their geography with Crusoe's island, work sums expressed in terms of Crusoe's productions and occupations, and so on. Crusoe would appear as persistently in the lessons as King Charles's head did in Mr. Dick's literary productions.

A scheme of this kind appears fantastic enough at first sight, nor does further acquaintance lead to a higher

opinion of its wisdom. It is, indeed, a somewhat pedantic attempt to apply to teaching a mechanical interpretation of Herbart's conception of the nature of mind. According to this theory, mind consists of its ideas, and its ideas are the result of its interaction with the world around it. This has been interpreted to imply that a mind can be built up by putting before it ideas, as one builds a house by putting together bricks, and that its form and nature will be as much determined by those ideas and their connections as a house is by the form and arrangement of the bricks of which it is composed. Hence, a unified mind will be one whose ideas are all connected with each other. This connection is called the 'circle of thought.'

Such an interpretation finds no place for the active seekings and strivings of the mind, but reduces its activity to the reception of ideas. Whether this is the true interpretation of Herbart's not too lucid exposition of his doctrine does not here concern us. But it is obvious that it is a somewhat violent proceeding to infer from this that the 'circle of thought' out of which the will is supposed to spring, and which it is, therefore, the aim of Herbartian educative effort to form, can be determined solely by school lessons. Even if we granted that ideas form the mind, yet we must not forget that there are many avenues, often unsuspected by the teacher, through which ideas reach the mind. No matter how carefully the teacher tries to weave such ideas into the 'circle of thought' he is attempting to form, he can never be satisfied that there is not somewhere a break in the circumference which renders his efforts futile.

Still, all this is incidental. The essential error of the theory is the assumption that human life can be built up from without, and its form and tendency determined by

an artificial arrangement by another of the ideas it is to assimilate. The real unity of every life is a unity of purpose, just as the essence of life is the seeking means to carry out its purposes. Now, unity of purpose is a gradual attainment: no one ever fully reaches it, and most people approach but little way towards it. Even with the wisest of men a wholly systematised life is rather an ideal of thought and aspiration than a reality of experience. As this is so, it is evidently futile to attempt to force on the young a unification of life for which they are of necessity unprepared. The young naturally apprehend the world in fragments, as their impulses and purposes lead them to deal with it. It is only gradually that this fragmentary apprehension becomes dominated by the conception of law and uniformity, and the passage from this stage of understanding the world to that in which it is regarded as a systematic whole is one which comes later still.[1] A true system of teaching must take account of this natural order of mental growth, and, consequently, will not seek to impose on the child a premature unification. In short, in any rational meaning of the words, a 'circle of thought' is neither possible nor desirable for the young even if that 'circle' were the origin of the will, and not rather developed by and through the operations of will, so that it is the concrete form in which the activities of will are gradually manifested.

Further, a scheme of study arranged on the 'Concentration' plan must obviously disregard any natural order of development which any subject, save that which forms the 'core,' may demand. In many subjects, such as history, mathematics and art, there is a more or less fixed order of learning, and consequently of teaching, demanded by the subject itself, and if this is not followed a real set of

[1] *See* Welton, *Logical Bases of Education*, Chap. I.

relations within the subject is sacrificed to a more or less artificial set established arbitrarily between that subject and others. Moreover, as the 'core' is changed year by year, the 'circle of thought' would seem to be continually reconstituted round a new centre. So impracticable, indeed, does the scheme soon become that even its most ardent advocates have never succeeded in applying it to the higher forms in a secondary school. Yet were the scheme based on a true psychological and logical theory its applicability would become easier as the pupils advance in knowledge; for such advance is before all else advance in systematisation and unification, and such unification is the very thing 'concentration' aims at accomplishing. But, as a matter of fact, as the pupils attain a fuller and really logical unity in their mental contents, the artificial and mechanical unity aimed at by 'concentration' more and more completely breaks down.

Natural Correlation of Knowledge.

We must, then, reject the doctrine of 'concentration' as pedantic, artificial, and illusory. At the same time we must claim that, as the aim of teaching is to lead the young to grasp the general relations of things about them, we should make prominent in our teaching real relations of fact with fact and of idea with idea. In this way we shall make 'subject' help 'subject.' For it must be remembered that the division of knowledge into 'subjects' is merely an artificial device enabling men to specialise their efforts. There is no corresponding division between the contents of the world, and every human purpose in its fulfilment trenches on the domain of many 'subjects,' though the purpose itself may be confined to one.

If, then, school work is to correspond with real life it must not set up rigid walls of demarcation between the various lines of mental and physical activity, but must encourage

the learning process to draw together all pertinent material, and to find scope in as many ways as possible. Thus, history and geography will always be studied hand in hand, composition will find its materials in the content of other studies and in the out of school life, drawing and modelling will be called in to help nature study by that more definite apprehension of form which an attempt to reproduce it ensures. Nor will such correlation be confined to studies simultaneously pursued; every available piece of life and knowledge should be drawn into the net. In short, all modes of appropriate learning activity will be called into play by every piece of teaching, and in this way will be secured the only valuable correlation of studies—that which establishes relations of which the learning mind has found the necessity or the advantage. Of course, such apprehension of relations becomes fuller and wider as knowledge advances, for each accomplished purpose is the starting-point for fresh efforts and new conquests.

Construction of the Time-Table.

One other point remains to be noticed. It is evident that as the pupils advance in knowledge and power the material of their instruction should develop in depth and scope. In the early stages much time must, of necessity, be given to the acquirement of facility in using the tools of learning, but as mastery is acquired these tools should be put to a real use. The school has no time to spend in "grinding air." Hence, in the lower classes considerable attention must be given to the acquirement of the mechanical power of reading, writing, and spelling, and to mastery of the elements of computation. But as soon as a pupil can use freely these instruments of learning, merely formal drill in them should be replaced by application to real processes of learning. In the upper classes there is no place for formal writing or spelling lessons, nor for reading

lessons whose sole aim is the development of the mechanical power of expressing printed symbols by spoken words. Practice in the arts of reading and writing is, indeed, still needed, but it should be obtained through reading and writing matter which, on account of the ideas expressed, is worthy of attention. A Time-Table should, therefore, show a gradual decrease in the amount of time given to drill in the use of the tools of learning till such drill disappears altogether, and a corresponding increase in that devoted to the study of material which is in itself, and because of its contents, of value in the culture of the mind.

CHAPTER III.

FORM OF INSTRUCTION.

Test of the Value of Teaching.

1. A WELL chosen and well arranged course of study increases, and, to some extent, determines, the opportunities of the pupil to enter into fruitful relations with the world in which he has to live. But his education thereby is secured only so far as he avails himself of those opportunities. In a very true sense all real education is self-education, and all learning is by doing. Each individual pupil must, by his own effort, relate himself to his environment. This implies that he sees how he can utilise this or that—thing, event, piece of knowledge, idea, skill, or whatever it may be—to attain some desired end or to carry out some cherished purpose. It is the very essence of effective teaching to awaken desire and to evoke purpose. All teaching must, indeed, be judged by the test of how far it succeeds in promoting persevering effort on the part of the pupil to put himself into such relations with his surroundings as the teacher desires.

Perceptual Activity.

Whilst the pupil is a child his activity is largely perceptual, or concerned with the material things which surround him, and with their more obvious relations to himself, either as giving him some pleasure of taste, or sight, or hearing, or feeling, or of furthering or hindering some form of his physical

activity. In these early years, then, he learns largely through physical activity of hand and eye and ear and voice. Hence, good teaching of young children appeals in all suitable cases and ways to the physical activity of each pupil, which it so directs and organises that the child is led to become familiar with many relations between himself and the material world around him. But it must be remembered that perceptual activity is not confined to the use of the hands and eyes in dealing with given material objects. Such activity is equally called into play when in speaking, or writing, or drawing, or modelling, a child reproduces his remembrance of the things he has perceived, or his idea of things of which he has heard. Some form of reproduction, therefore, should form a part of every piece of teaching through the child's perceptual activity.

Conceptual Activity.

But at no time in school life is a child's activity solely perceptual. In other words, he concerns himself not only with things and their perceived relations in space, but also with their more hidden relations of causation and purpose. As soon as a child begins to ask the 'why' and the 'how' of things we may be sure that he has passed beyond the merely perceptual stage, and this generally takes place not later than his fifth year. By the time he enters the primary school his perceptual activity is inseparably united with a conceptual activity of thought which aims at establishing relations which in their very essence are general. Not that the child consciously and deliberately generalises, but that his interest passes beyond the objects perceived to relations of cause and purpose which, when once grasped, are applied unhesitatingly to other instances. Such conceptual generalisation is as natural and as spontaneous as is the perception of colour or of taste. In each case the mental process is

liable to error, and a teacher's guidance is, therefore, valuable so long as the temptation to perceive or to think for the child, and to impart to him a form of words embodying the results of the teacher's activity, is resisted. A teacher can no more perform for his pupils the functions of mental assimilation than those of physical digestion. He can, by much insistence, cause certain labels of information to adhere for a time—though, alas! they sometimes get woefully displaced and confused; but this no more feeds, trains, or develops the mind than covering the body with adhesive postage stamps would nourish or exercise it.

Teaching, therefore, does not properly exercise the activity of any normal child of school age when it confines his activity to various forms of physical doing, and leaves undirected, and therefore uneducated, the more important mental activity in which his thought seeks for relations between things. With some children, no doubt, this thought goes on nevertheless, and in the case of the better minds it in time attains its goal. But there are children averse from mental activity, as there are those who are physically lazy, and with these the very essence of effective teaching is absent unless they are stimulated to ask 'why?' and 'how?' and to seek answers to those questions.

Further, it is only so far as general relations are grasped that individual things or facts can be wrought into any purpose whose accomplishment is not in the immediate present. A boy may climb a tree by merely perceiving the space relations of branches and trunk and the various inequalities of surface they present, and apprehending much less consciously the relations of strength to pressure which render one possible foothold secure and another dangerous. But if he desires to do something whose accomplishment is more distant he has to plan the

means to attain his purpose, and such planning involves the conception of various general and uniform relations. For example, a boy desiring to become a good bowler in cricket practises much; but in all such practice he is gradually establishing in his mind general relations between certain modes of delivering the ball, certain conditions of the wicket, and certain results, and the whole process is dominated by the general idea that skill can only come through much practice. Or if he desires to produce some more tangible result than skill in bowling, say to make a toy yacht, he must apprehend and apply many general relations which when abstractly stated we call the laws of physics. No doubt, in all such cases the general relation is found and utilised in the particular example, so long as the process is a familiar one or one which can be imitated from another. But the power to detach the general relation from its familiar embodiment and to apply it to new conditions is shown whenever an adaptation to different circumstances is made.

Perseverance.

Whatever its form, every activity which is worth anything in life is marked, not only by an immediate effort put forth, but by perseverance even in the face of obstacles. Hence, teaching which aims simply at the present, and is satisfied by winning the 'attention' of the pupils and exciting their 'interest' by various attractive devices, is of the smallest educative value. Indeed, there is in such cases neither true attention nor true interest, for the essence of both is permanence of direction in effort. In such lessons the pupils may be 'interested' in the common but inaccurate sense of being pleasurably excited, but not in the true and educative sense of being inspired with a purpose to know or to do. Without inspiration of purpose there can be no true educative activity, for nothing else leads the pupil to

put forth persevering effort to attain a result in which he is interested, that is, which he feels to be of value. It follows that in effective teaching the pupils both know and desire the object the teaching is intended to attain. It may be true that not every pupil will be led to desire every piece of knowledge or every form of skill the teacher places within his reach, but it is certainly the case that no such desire can be evoked in any pupil who does not know what the teaching is meant to accomplish. To evoke desire without indicating anticipated effect is impossible.

The test of all teaching is, then, the extent to which it evokes purpose, and so excites and directs the fullest activity of thought of which the pupils are capable towards the accomplishment of that purpose.

Characteristics of Good Method.

2. This implies that effective teaching is methodical, for method is not a dead arrangement of facts in a teacher's note-book, but a living process of thought in the pupil's mind, by which he advances towards a definite end along the best and most effective way. Methodical teaching is that which secures methodical learning. The teacher is like a guide, and the pupil like a traveller in an unknown country. The traveller knows where he wants to go, but knows neither the way nor the exact character of the place he wishes to reach. The guide knows both, and plans the journey so as to set out from where the traveller now is and to reach where he desires to be, and that by the best way. Such plotting out of the journey is analogous to the teacher's laying down his course of instruction in any subject with its order of topics and arrangement of matter. But unless the traveller—that is the pupil—take the journey himself, nothing is accomplished. Many a lesson is too much like a guide describing

the journey to the would-be traveller, who sits and listens but does not leave his chair to undertake it. In other lessons the guide himself laboriously takes the journey again and again, but the traveller that should be remains inert. In short, no matter how admirably a lesson is planned, there is no really methodical teaching unless the pupils by their own efforts pass along the road traced for them; for, as has been said, true teaching is nothing but arousing and directing the learning activity of another.

Purpose.

The first step in effective teaching is, then, to take the pupils into working partnership in the process, to let them see as far as they can why they should try to learn this or that. Of course, it is not meant that the teacher should put before his pupils an abstract statement of the beneficial results he hopes and expects his teaching to have. That would defeat his own object, for such a statement would not appeal at all to the young. But he should endeavour to make his pupils see that the new knowledge or skill will be of some worth to them, in that it will help them to understand and to do things worth understanding and doing. This is not so hard as it would be were children not, as a rule, keen to learn how to do what they see others do, and to understand what is understood by those around them. This wish to put themselves on a par with others is in itself a spur to effort from which the learning process may start, and to which the teacher may explicitly or implicitly appeal. When once the start is made, the growing skill or knowledge has in itself a propulsive force, so that the will to increase it arises and grows stronger, if only the skill or knowledge is constantly utilised and applied, as soon as it is acquired, in ways of which the pupil can appreciate the value.

Of course, teacher and pupil are in very different relations to the end sought. The teacher knows it clearly and definitely. But in the pupil's mind the end is relatively vague and indeterminate. It is desired, because it is connected with relations already known and whose value has been proved, and because it is looked upon as a further step in the attainment of some desired form of knowledge or skill. The teacher, for example, may inspire a pupil with the desire to know how to make a kite, or to swim, or to be able to speak and read French. But the very fact that such things are objects of desire implies that they are not yet attained. Hence the learner's apprehension of the end to be sought is necessarily vague and indeterminate. This vagueness is greater in some cases than in others, and, speaking generally, it may be said that the younger the learner the less is the amount of vagueness which is compatible with the rousing of desire. Unless, however, the teacher's apprehension of the end sought is in every case clear and determinate, his teaching must lack both point and method. Either the end will not be attained under his guidance, or if it is more or less accidentally reached it will be only after much wandering by the way.

Economy of Effort.

This leads us to the second characteristic of good method —that the effort excited by the desire to attain a particular end should be so sustained and utilised that as little as possible of it is wasted. Waste of effort may obviously result either from starting from the wrong point or from wandering by the way. The beginning of a piece of teaching should, therefore, make the fullest use of what the pupil has already acquired, without assuming those acquirements to be greater than they really are, and should then go on regularly and continuously towards the end in

view. There is thus laid down for the pupil the direct path along which his thoughts should travel.

Prompt Beginning.

Having, then, set an aim before the pupil and inspired him with a desire to attain it, the next essential is that the learning process should begin promptly. Particularly is this the case with young children who can look but a very short way ahead, and whose attention even when aroused is easily diverted into other channels. A teacher may easily damp the interest excited by his indication of the object of the proposed teaching by floundering about at the beginning like a racehorse making a number of false starts.

There are two very common forms of such floundering. One is the traditional 'introduction' to a lesson, which usually consists in an endeavour to 'elicit' from the pupils a verbal statement of the subject of the lesson, carefully hidden in the teacher's mind. Such a beginning violates both the essentials of good method we have considered—felt purpose and definite start. The teacher asks a vague question in the hope that amongst the guesses of the pupils the name of the subject on which he intends to speak may be found. When it is, he is satisfied and believes he has excited the self-activity of the pupils. For example, a teacher once began a lesson by asking the pupils "What did you have for breakfast?" Of course he got dozens of answers, but not the one he wanted, so after some ten minutes he exclaimed with some heat, "Well, you *ought* to have had coffee!"—for coffee was the subject of his lesson. Now, if such an instance is considered, it will be seen that in addition to the waste of time involved there was nothing but dissipation of the pupils' attention, or rather there was no real attention at all, for there was no effort to advance in any definite direction. Moreover,

had the word 'coffee' been among the pupils' answers nothing would have been gained. The mental process in reaching that answer would have been exactly the same as in reaching the undesired answers—mere guessing—and of no more worth. The excitement of guessing which such a mode of beginning a lesson arouses is too often mistaken for what is really the exact opposite of it—true educative interest. The latter implies effort to reach a desired end; the former has no end to seek.

The second common mode of wasting time and of lulling to sleep any interest which may have been raised by a clear statement of the purpose of the teaching is an over-elaborate 'preparation' of the pupils' minds to receive the teaching. In this, the teacher questions the class so as to bring forth everything known which bears in any way on any part of the lesson. Time and energy are thus wasted in the hope of avoiding such waste in the future. But even this is not necessarily assured, for the class has not one mind, but many minds, and the 'preparation' is unlikely to have been equally effective with all. Moreover, by wandering all over the proposed lesson so as to get the relations of each part ready before the teaching is begun, the attention of the pupils is hindered from advancing. The attitude of mind evoked is often not very different from that induced in the former case, and there is at best a mere marking of time. And marking time mentally is as ineffective and as tedious as doing it bodily: no process is more capable of deadening true interest and destroying incipient effort.

Let the teacher, then, having so placed his object before his pupils as to rouse in them the desire to make the attainment of that object their own, as briefly and concisely as possible pick up the thread of knowledge and get the pupils into the line of thought which leads from their

present acquirements to the new end. The better the teacher knows his class the more accurately and quickly can he do this. When his class is strange to him, he may be aided by the experience of the previous teacher, but in no case can his start be as sure or as sharp as when he is teaching pupils he knows. In both cases it is obvious that this starting-point must be known before the planning of the lesson can be profitably begun. It is this determination of the starting-point, this power of putting oneself in the mental place and attitude of the pupils, that marks off the true artist in teaching from the mere mechanical grinder of facts and formulae. To know where the pupils are and where they should try to be are the two first essentials of good teaching.

Orderly Process.

But to avoid waste of time and energy at the beginning of the lesson is only half the battle. Good teaching also avoids such waste in the passage. Skill is here required in keeping the pupils to the right path without hampering that free self-activity in learning which it is the essence of good teaching to promote. There can be little hope of success unless the teacher has previously plotted out the matter of instruction, first under general topics, then into lesser portions, till he has reached the smallest steps of individual lessons. These divisions must follow one from the other, so as gradually to build up a systematic whole of knowledge or an organised habit of skill. This is a logical question, in the broad acceptation of that term.

Having thus plotted out the scheme of instruction the teacher must next consider how the pupils with whom he has to deal can be led to assimilate this system of knowledge, or to acquire this organised skill. The first essential is to apportion the amount to be mastered in each lesson to the capacity of the pupils. To give too much means hurry,

and, as a probable result, those sham lessons in which the teacher travels through the matter, but the pupils do not. If too little is planned, there is not only the actual waste of time, but the probability of deadening interest in the subject as a whole, and of cultivating a habit of mental inertia which is one of the saddest products of the school. This question of amount is, of course, a psychological one, but it must be decided by familiarity with particular children, not on general psychological grounds.

Stimulation of Learning.

In the next place, the teacher must consider how these particular pupils can most effectively be led to take the mental steps desired, and the answer to this will, of course, vary with every lesson. This part of the teacher's preparation for his teaching is also psychological, for he has first to ask himself what form of mental effort is needed, and then to consider how he may stimulate that effort. Yet, no matter how carefully all this may have been thought over beforehand, the true teacher is always ready to adopt other means which may suggest themselves of prompting his pupils to the right form of effort. He must keep in mind the direction their thoughts should take, and when he sees a tendency to diverge into side issues, set them again in the right path by suggesting a line of thought which leads back to the main track if the divergence has not been serious, or by stopping short and reminding them of the original purpose of the lesson if it has been. Of course, this latter event shows that the teacher has followed the pupils' lead somewhat blindly, but such cases will occasionally happen, and then the best thing is to return as soon as possible. This wandering by the way, which is a marked feature of most conversations, is more likely to occur in conversational lessons than in any other. It is most mischievous in lessons which

develop a line of reasoning, and in these the teacher must be specially on his guard to avoid it; but in lessons whose aim is to increase knowledge of some object which has many features worthy of notice, a less rigid line of advance is demanded, and a lesson should not be condemned as desultory and wandering because it does not treat these in any special order, but only if it neglects to bring all the items into true relation to each other and to the whole.

The educational object of arranging the matter of instruction is that the pupils' minds in assimilating it may develop a systematic whole, and may be aided in putting forth real attentive effort. There are many obstacles which a good teacher will leave his pupils to overcome for themselves, but the task of arranging the subject-matter of learning is a difficulty which must not be left to them to deal with, for it is one which can only be properly mastered when the whole which is to be arranged is known. This, then, is pre-eminently the teacher's work. To leave the child to discover everything for himself without guidance would be an absurd and fatal blunder; but equally absurd and fatal is it to do the lessons in his presence and only demand his acquiescence. Nearly as fatal is it to attempt to remove all obstacles from his path. When the teacher is always at hand to tell, to suggest, to question, the pupil learns to rely on him for the solution of every difficulty immediately it presents itself; and not being trained to methodical attention, he never realises the idea of method and of persevering effort, for he never sees more than the one step he is actually taking. He starts with a purpose, perhaps, but he loses sight of it in following the too minute instructions of his teacher. He is like a blind man who travels along a road, not by seeing where he is going, but by planting each step according to the detailed instructions of another. Children, like men and women,

must work out their own intellectual salvation, and they cannot do this unless they are largely left alone to grapple with their own giants and to overthrow them.

Methodical teaching, therefore, means the promotion of methodical learning, that is of concentrated persevering effort directed towards the attainment of a felt purpose and guided in general direction, but in no case replaced, by the more copious knowledge and more fully developed power of the teacher.

Effective Result.

Where teaching has exhibited the characteristics of good method just considered, the final mark of effectiveness is not hard to secure. Effective teaching implies effective learning, that is, the development of some form of power. Such increase of power may be shown in greater ability to understand certain aspects of the world, in greater skill in doing this or that, in deeper sympathy with the good, in fuller appreciation of beauty, indeed, in any enrichment of the life of the pupils. Each piece of teaching deals with some kind of relation between the pupils and their world, and it is effective just so far as it helps them to deal better with that class of relations in the present and in the future.

It is obvious, then, that the success of much of the most important teaching cannot be gauged at all by the pupils' power to talk about its subject-matter. This is an age of talk, and many people seem to think that to give children power to talk implies the development of capacity to do. The success of lessons on health has been judged by the worth of essays on various parts of the subject written by the pupils. But an excellent essay on cleanliness, written by a boy who has neglected to clean himself, is certainly no proof of effective teaching. In short, the test of effectiveness must be appropriate to the matter tested.

This suggests that the methods of securing effectiveness will be various. When new information has been imparted, the fruitfulness of the learning is shown by the power to reproduce the essential features of it in a rational connection, and by the will as well as the power to use this acquired knowledge as the basis of further advance: to such organisation and application of knowledge the teacher must try to lead his pupils. When the teaching has aimed chiefly at increasing the understanding of matter already familiar, its success is shown by the clearness and accuracy of the explanatory ideas the pupils have grasped, and by the power to see the direction in which such ideas may be expected to explain yet other of these phenomena: to securing clearness of idea and readiness in application, therefore, must the teacher direct his efforts. When the teaching aims at increase of constructive or executive skill, its effectiveness is seen in the gradual perfection of the adaptation of movement to end sought and in the growing difficulty and remoteness of such end: to secure continuously increasing perfection must here be the teacher's aim.

In all cases it is evident that growth in effective learning is gradual and continuous. Consequently, effective teaching must be continuous and well graded. The not uncommon practice of treating each year's work as a whole in itself, and neglecting to connect it with previous years' work, is fatal to true effectiveness. Further, the results of teaching must be sought in a growing power of apprehension, of understanding, and of skill, and not merely, or mainly, in the mastery of fresh matter, a mastery which too often is no more complete in the upper classes of a school than in the lower: the matter dealt with is different, the power to deal with it remains stationary.

Maxims of Method.

3. Concerning the proper order of instruction certain maxims have become traditional. Thus we are told

(1) Proceed from the known to the unknown.

(2) Proceed from the easy to the more difficult.

(3) Proceed from the concrete to the abstract.

(4) Proceed from the empirical to the rational.

(5) Proceed from the simple to the complex.

(6) Proceed from the indefinite to the definite.

Stated thus abstractly such maxims may lead the teacher wrong as often as they lead him right. For neither the scope nor the point of their application is uniform.

Proceed from the Known to the Unknown.

The first merely implies that new knowledge is apprehended in the light of old knowledge and that the two should be united in an organic whole. It is, therefore, merely a summary way of saying that the teacher should arrange the subject-matter of instruction so that each part is properly connected with what precedes it. But it gives no hint that this merely serial arrangement is insufficient, and thus it is imperfect even as a maxim regulative of the presentation of new knowledge. To teaching whose object is not the acquirement of new knowledge the maxim has no application at all; and as a statement of what goes on in the child's mind it is obviously false, for in knowledge the child's progress is towards making known what was before unknown.

Proceed from the Easy to the more Difficult.

The second maxim is true in a very broad sense, but it leaves open the whole question as to what is 'easy' and what is 'difficult.' Moreover, in matters of doing it implies that gradation should be sought in the objects dealt with rather than in the skill in dealing with them.

This is never more than half the truth and is often wholly false. A young child, for example, will draw similar objects to those drawn by his more advanced schoolmates, but he will draw them less well. The power of using legs, arms, and hands becomes more perfect by practice, but in many cases such practice does not demand gradation in the objects on which it is exercised. In matters of understanding the maxim can only be accepted with important reservations. As Bacon long ago pointed out, there are cases in which it is well to plunge first into the more difficult parts of a subject and then the easier parts will be of the nature of recreation. And it is certain that no branch of study can be followed properly if an attempt is made to arrange its subject-matter simply in the order of difficulty.

Proceed from the Concrete to the Abstract. Proceed from the Empirical to the Rational.

The third and fourth maxims apply rather to the general order of human acquirements than to anything more specific. Man begins by apprehending things and passes on slowly and gradually to understanding them as parts of the world around him. The things are the 'concrete,' and his first apprehension of them is empirical, that is, he experiences them and becomes familiar with them, but he does not understand their nature, nor does he grasp their place and function in the world. Such understanding, however, soon begins to arise, and the first step is the consideration of things not as wholes, but in particular aspects or relations. These are the 'abstract.' But one cannot rest satisfied there. One cannot reduce one's world to mere empty relations which may be calmly viewed by the intellect, but which make no appeal to the feelings, the desires, or the will. One finds the abstract in the concrete merely that one may more fully understand the concrete. And in so far as one thus sees

abstract and concrete as one organic whole one's conception has become rational. Hence, to attempt to apply the maxim, "Proceed from the concrete to the abstract," indiscriminately to teaching would be a serious error. In some lessons we do start with the concrete and by analysis reach the abstract. But this is only half the process. Such lessons must always be followed by others in which the order is reversed and in which we use the abstract we have obtained to explain other concretes.

The maxim, "Proceed from the empirical to the rational," is true, but in its abstract form it is so full an expression of the order of the development of knowledge that it is but an indefinite guide to teaching. For it is obvious that the advance can never be fully made in one lesson, nor indeed during school life, especially school life which ends at fourteen years of age. In its full sense it never is made, and never will be made till human knowledge is complete. The maxim may serve, however, as a useful suggestion to teachers to inspire their pupils not to rest satisfied with mere experience and familiarity, but to try to understand the meanings of things about them, so far as the limitations of their knowledge and mental power make it possible for them to do so.

Proceed from the Simple to the Complex.

The fifth maxim describes somewhat crudely the development of ideas in the mind. A child's empirical apprehension of objects is 'simple,' because he has not by analysis discovered their complexity. When he has found many 'abstracts' in a 'concrete' and again built up the concrete by putting together those abstracts his idea has become complex. But the object has remained the same all along. It is not, therefore, surprising that the application of this maxim to the arrangement of the subject-matter of instruction has led to some of the worst methods

of teaching the world has ever seen, as, for example, to the beginning a foreign language by a minute and ordered study of the grammar, with copious exercises on every point; to the beginning geometry with abstract definitions, postulates, and axioms; to the 'alphabetic' system of teaching to read; to the teaching of drawing by elaborate and long-continued exercises on straight lines, then combinations of straight lines, and so on, to more 'complex' figures, on the ground that the line is the 'simplest' element of form. So it is in the sense that it is the ultimate result of the analysis of form. But as the child does not naturally make this analysis its results are not 'simplest' to him in the sense of being most easily apprehended.

But, it may be urged, the maxim is surely applicable to the acquirement of skilful and complex movements. This must also be largely denied. Nothing is more obvious to one who observes than that, in learning to do anything, the first attempts are marked by a great exuberance of movement, and that as skill is acquired many of these movements, being found unnecessary and at times inconvenient, are discontinued. The movement as it becomes more perfect becomes actually simpler. Watch a child learning to write and note how many needless, and even hindering, movements of head, tongue, and body he makes, which he will gradually drop as he acquires the art. No doubt in learning to do things, gradation in difficulty is often good, but to give this as the meaning of the maxim would be to make it a mere synonym of "Proceed from the easy to the more difficult." If regarded as applying to the organisation of instruction the maxim is, therefore, either false or unnecessary.

The sixth maxim also deals, not with the arrangement of subject-matter, but with the development of ideas in the child's mind. To use it, therefore, as a guide to the

plotting out of the curriculum is to fall into a serious mistake. All teaching should deal with definite subject-matter, but the child's ideas of that matter—like his skill in acquiring movements—become more perfect as he advances from the empirical to the rational stage of knowledge, and such increased perfection of ideas will be marked by increased power of clear expression. This, therefore, the teacher should expect as one of the results of his teaching.

Proceed from the Indefinite to the Definite.

A maxim less frequently accepted by English teachers is that the education of the child should agree in its sequence with that of the race. This has very important limitations. In his mental life the child does, indeed, bear some resemblance to the savage. But still more important are the differences; the child is after all a child, whilst the savage is an adult, and no theorising can eliminate this essential difference. Nor can any theorising negate the difference between the state of civilisation which surrounds the child and that of ignorance and superstition which surrounds the savage. To attempt to arrange the curriculum, then, mainly under the guidance of this exaggerated parallelism in development of child and race is futile. Such attempts are mainly made by those who try to apply a theory of 'concentration.' These usually make their core of instruction literary-historical, and arrange it in accordance with this supposed parallelism, whilst the order of teaching all other subjects is determined by relations to this core. If nothing else showed the hopeless artificiality of the arrangement, the fact that the parallelism is completed by the time the child leaves the primary school at fourteen would do so, for nothing is more certain than that the child, at that age, has not entered

The Development of the Child is Parallel to that of the Race.

into the full heritage of the race; he has not attained maturity of mind any more than he has reached the physical stature and powers of manhood.

It would seem, then, that such maxims of method as we have briefly considered are of very limited value. As summing up certain aspects of empirical pieces of teaching they lay down some occasional conditions of success. But they ostensibly lay them down as universally true, whilst their truth is really only particular and special. They are thus misleading and suggest bad teaching quite as easily as good.

Psychological Basis of Method.

4. It is obvious, then, that something more definite than the traditional maxims is needed as a guide to method. And it follows from the conception of teaching as correlative with learning that such guidance must be based on an analysis of the way in which the mind proceeds in evolving knowledge out of its experience.

Such an analysis yields the broad result that knowledge begins in experience, and grows through the action of the mind on experience. The general process may be summed up by saying that every new experience is understood by the aid of past experiences consciously or unconsciously brought to bear upon it. For example, every act of recognition is possible only because former experiences of the same or similar objects have left in the mind a tendency to notice objects of that kind. But the mere persistence of such tendencies would not be sufficient to give us real understanding of our present experiences, for these would still remain fragmentary and isolated. It is only so far as immediate experience has been interpreted by inferences and looked at in the light of received theories that it is helpful to us as a guide of life.

Thus, the full content of mental life at any moment is not only the experiences which are immediately present to consciousness through the senses, but those experiences as illuminated by the results of past experiences interpreted in the light of opinions and general ideas which we have either accepted from others or arrived at by our own thought, or, more frequently, accepted after thought on the suggestion of others. What we know as a 'fact' is always an experience so interpreted. We say, for example, that it is a fact that the earth goes round the sun. Such a fact is obviously the current way of explaining certain solar appearances which alone appear in immediate experience. But to our forefathers it appeared to be a fact that the sun goes round the earth. The solar appearances are the same; it is the system of thought by which they are interpreted which has changed. Fact and theory are indeed indissolubly connected, for every fact is viewed in the light of some theory.

Yet theories are continually being developed out of facts. In other words the facts as we know them—that is, as viewed in the light of our present theories—are always being more closely examined and analysed, and as a consequence the theories are often changed, and then the facts have a meaning for us different from that which they had before. In this way knowledge grows. Facts, as we know them, yield up their life and take on a new and higher form when seen in the light of newer and truer theories. And we know the newer theories are truer than the old, just because they do explain and make consistent and intelligible facts which before stood, as it were, apart, and which we could not explain, that is, fit into the general scheme of things.

By such an analysis of the process of the growth of knowledge we may separate out several factors. There is,

first, the part played by old knowledge and past experience in enabling us to understand new experiences. Secondly, there is the part played by new experiences in furnishing the material for the growth of knowledge. Thirdly, there is the analysis of experience, involving comparison of case with case, and leading to the formation of general ideas and the formulation of theories. Lastly, there is the utilisation of these ideas and theories in the explanation of further facts.

The Herbartian Formal Steps of Method.

5. It is on such an analysis that the well-known Herbartian theory of the 'Formal Steps of Method' is based. As usually stated these steps are five in number: (1) Preparation, (2) Presentation, (3) Comparison, (4) Generalisation, (5) Application, though some writers combine the third and fourth steps under the term Abstraction. These steps are then made applicable to every 'Method Whole,' that is, apparently, to so much of a piece of teaching as may rightly embrace them all. Such a method-whole may consist of one lesson or of many. It cannot, then, fairly be charged against the Herbartian theory that the formal steps force every lesson into the same cast-iron groove, though some enthusiastic Herbartians show a tendency to do this.

Nevertheless, the scheme is open to serious objections. It suggests, even if it is not based on, the assumption that the factors in the process of acquiring knowledge must be consecutive in time. But this is far from being the case. Fact and theory, direct experience and thought, react on each other continuously, so that actual living thought presents little in common with this cut and dried time-order of learning. That the steps are regarded as expressing a time-order is evident from the explanations given of their function Thus, for example, Mr. Van Liew says: "Preparation

. . . analyses the mental content of the child for the purpose of getting at the possible ideas upon the subject in hand that are already present in the child's mind. . . . It should cover so far as possible the entire content of the method-whole."[1] Now this is certainly not the way in which knowledge is actually acquired. The ideas from the past are brought to bear on the present, each as it is needed, and nothing is gained by summoning ideas at the beginning of a method-whole which will not be needed till a later point is reached, it may even be after an interval of several weeks. Nor do we postpone comparison and generalisation till our new facts are all before us; indeed, if we did we should never compare and generalise. For we should never know when the facts are complete—or shall we not rather say, we should always know that they are never complete? To make 'Comparison' a separate step further suggests the false theory that generalisation is based on such resemblances between things as force themselves on our senses, and not on that inner identity of nature which is only revealed by a deeper analysis which penetrates beneath the outward appearances of things. Such an analysis can only be carried on in the light of a theory which it tests, and cannot, therefore, precede the conception of such a theory.[2]

That the theory of the formal steps was founded on a mechanical and discredited view of mind growth as determined solely by the interaction of ideas presented from without cannot, perhaps, be urged against it, as it is now advocated by many who hold an exactly opposite view of the nature of mind. One cannot help thinking, however, that it would be strange indeed if a theory of instruction based on a false psychology should be equally well

[1] Translator's note in Rein's *Outlines of Pedagogics*, pp. 149-151.

[2] *See* Welton, *Logical Bases of Education*, pp. 181-3; 136-9.

connected with a true and contradictory psychology. Undoubtedly, in the original theory the 'Presentation' was essentially the work of the teacher; he also was at least equally in evidence with the pupil in the work of 'Preparation,' and in that of 'Application.' But in 'Comparison' and 'Generalisation' we have the interaction of the child's ideas upon each other. The steps are, therefore, somewhat uncertain in their reference, in that some express primarily the teaching side of the process and others the learning side. When an attempt is made to apply the steps throughout either to the teaching process or to the learning process the terms are seen to be unsuitable, in that they do not uniformly express the features of either.

Further, the advocates of the scheme often seem to assume that all school work can be divided into method-wholes, in each of which the process is completed. This is not the case. Effective theorising in such subjects as history is not possible till long after primary school days are over; in literature often not at all. And all those forms of teaching which aim at the production of constructive or executive skill fall outside the theory altogether: attempts to apply the steps to them are painfully pedantic.

Even in subjects to which the scheme can be more or less applied it is acknowledged that in many lessons only the first two steps can be taken. This practically abolishes the guidance the theory is supposed to give. For if after recall of what is already known there is nothing but 'Presentation,' obviously the order in which 'Presentation' is to take place is left just where it was: the theory has given no guidance to the teacher. In fact, no merely formal steps can give much direct help in plotting out actual pieces of teaching. Each such piece of teaching

deals with certain definite subject-matter, and the real steps in the process are only to be found in the nature of that matter in relation to the minds by which it is to be apprehended.

Further, every such formal scheme of method lies open to the objection that it tends to mechanise instruction. Everything which limits the freedom and spontaneity of the process which is at once teaching and learning is a hindrance and not a help to educative work.

Chief Classes of Lessons.

6. Turning, then, from this attempt to reduce all teaching to one general form, we will begin our inquiry for general schemes of method by fixing our attention primarily on individual lessons, which it has been already said must be connected together in a rational order.[1] Though every form of the learning process may go on in any one lesson, yet a little reflection makes it evident that the predominant feature in one differs from that in another. There are lessons in which the main aim is the increase of information or the apprehension of fact. In these the learning process is predominantly perceptual.[2] There are others of which the essential purpose is to examine and analyse facts already familiar, so as to reach a fuller understanding of them; in other words, to develop theories and general ideas. In these the mental process in learning is essentially conceptual, and the order of thought is inductive.[3] Thirdly, there are those whose primary function is to apply and utilise knowledge which has already been acquired. In these, also, the mental process of learning is conceptual, but the order of thought is deductive.[3] And, fourthly, there are lessons which tend to develop constructive

[1] *See* p. 57. [2] *See* pp. 48-9.

[3] *See* pp. 49-51, and *cf.* Welton, *Logical Bases of Education*, pp. 119-122.

and executive skill. In these the mental process of the learner is either imitative or imaginative, and in each case the expression of the mental ideas by some form of physical activity is the characteristic feature.

Lessons of all these kinds would fall within every complete Herbartian method-whole, and the first three broadly correspond to the steps called 'Presentation,' 'Abstraction,' and 'Application,' under which last the fourth may also, though with some violence, be brought. But the correspondence is only very general. In no subject do the kinds of lessons follow each other in any fixed time order; indeed, examples of each are not necessarily found in any one branch of study. Moreover, as each kind of lesson corresponds mainly to only one step in the Herbartian scheme—though, of course, a 'Preparation' can always be prefixed—that scheme evidently throws little light on the method of individual lessons. Thus, even if the types of lessons could be identified with the separate steps of the Herbartian scheme, still a consideration of them separately would be likely to yield more definite help than is given by that scheme, which, as we have seen, under an appearance of methodical order often leaves us entirely without guidance when we come to deal with the actual work of giving lessons.

Lessons which aim at increasing Range of Knowledge.

7. Throughout school life, and especially in the earlier years, lessons which aim at the development of knowledge have as their primary object to increase its scope or content, or, as we may say, to widen the range of information. Such lessons deal mainly with the apprehension of facts. No doubt reference is made more or less indirectly to theories and general ideas which give the facts their meaning. Incidentally, too, the

apprehension of the facts may involve the exercise of constructive or executive activities. But the primary object is the extension of the scope of the pupils' knowledge. The steps of method in such lessons, therefore, must be relative to that purpose, and should be based on an analysis of the mental process involved in the apprehension of new facts.

Steps of Method.

In such an analysis, the first point that strikes us is the selective nature of the process. Not every fact around us is apprehended, but only those which win our attention. Such attention may flow out spontaneously to facts of a class which we have previously found interesting. Thus, pupils who have been much interested by previous lessons on plants may be very willing to attend to a new lesson on plants. Or the attention may be called to facts which have not hitherto interested us, but which force themselves on our notice in such a way as to hinder our activities or arouse our curiosity.

i. Adjustment of Attention.

The teacher has, then, so to introduce the subject of his lesson to the children that the desire to know it is aroused. Of course, no such subject is entirely fresh, and so the obvious thing to do is to call to the pupils' remembrance their cognate knowledge, and then to indicate the new matter of study as a desirable extension and development of that. It is by no means the case that all the previous knowledge will have been acquired in the course of school lessons. Indeed, the more closely the teacher can connect his lessons with the general life and interests of his pupils, the more successful will he be in arousing in them the desire to learn those lessons. This introductory step corresponds broadly with the Herbartian step of 'Preparation,' but differs from it in that the teacher should recall at the beginning only just

what is sufficient to get a good start, leaving other interpretative ideas to be brought into use as they are wanted. The first step, therefore, in the learning process is the *adjustment of attention,* and the corresponding teaching function of stating the aim and evoking desire may be termed *Securing the Starting-point.*

This will take very little time—the less the better. The bulk of the lesson will be, on the pupils' part, the *assimilation of new material.* On the teacher's part, the process is one of setting forth this new material in suitable ways and in ordered sequence, divided into steps, and pausing at the end of each step to secure reflection and recollection on the part of the pupils. The division of the matter into these steps demands skill and care as well as full knowledge of the subject. The steps must be determined by the nature of the subject-matter; the fulness with which they are treated, and the rapidity with which they are passed through must be decided by the powers of the class. It is no help to the teacher to be told to lump all these under a general heading such as 'Presentation.' Rather he must be exhorted to get such an insight into his material that his steps express its real articulation.

ii. Assimilation of New Matter.

Finally the pupils must *organise the new knowledge* and fit it into its place in their total system of knowledge so as to see its bearing and value. The mental process is again reflection and recollection, but more extended in its scope than at the close of the intermediate steps. The teacher's part is, by suggestion and indication of connections, to assist in this organisation. This may be done in a variety of ways each more suitable to one kind of subject-matter than to another. So long as the result is secured the mode of attaining it is justified. The success of the lesson may be

iii. Organisation of Knowledge.

gauged by the desire aroused in the pupils generally to carry that line of study further, and the most obvious utilisation of the new knowledge, at any rate as far as school work is concerned, is the employment of it to make this progress at once more facile and more rapid.

Modes of Learning and of Teaching.

Having laid down the general steps of method in such lessons, the next point to consider is how such teaching can be given in the most effective way. This also must be determined by a consideration of the nature of the knowledge to be acquired by the pupils, and of the way in which such knowledge is, or can be, related to the lives of the pupils.

Knowledge of facts comes to each one of us in two chief ways—either by immediate experience or from the testimony of others. Obviously the range of immediate experience of each individual, if we exclude from it all intercourse with our fellows, is extremely small. It follows, then, that by far the greater part of our knowledge of facts is derived from what others tell us, or from what we read in books. In these ways each individual avails himself of the accumulated experience of the human race, and enters into at least some small part of the heritage of human knowledge. It is, indeed, through intercourse with others that the child develops into the civilised and more or less cultured man. But the most usual medium through which we receive information from others is language, and the words of language convey meaning to us only as far as we can interpret them by a more or less direct reference to our own immediate experiences. It is, for example, impossible to convey adequate or correct ideas of colour to one who has been blind from birth, because the words in which we try to explain what colour is would have no reference to any immediate personal experience of our hearer. We can,

indeed, understand the description of things we have never seen, but we can do so only so far as this description guides us in putting together in a new form elements familiar to us in immediate experience. Our understanding of what others tell us is adequate, correct, and clear, just in proportion to the adequacy, correctness, and clearness of the ideas which the language calls up in our mind. And this again is directly dependent upon the care with which the corresponding experiences have been noticed and examined.

Now, we know that the great majority of our immediate experiences pass unnoticed. This, indeed, must always be so. Impressions from the world around us pour into our minds so continuously and in such unordered numbers that only a few can possibly win our attention. To attempt to attend to all would be to attend to none. As life advances we more and more limit our attention to the range of our interests, and such limitation is essential to effective work: without it our energies would be dissipated in all directions and no real result attained in any. But with the young, life-purposes and their attendant interests can hardly be said to have begun. It follows that one of the teacher's functions is to attract his pupils' attention to the events and things which enter directly into their lives. This he should do as widely as possible, though as his pupils advance in age he must expect, and indeed welcome, the beginnings of that concentration of interests which is essential to a really effective life. Of course, in the primary school such concentration will not proceed far, and will at most show itself in a preference for certain kinds of knowledge above others.

But to attend to immediate experiences is not sufficient preparation for understanding the communications

of others. There must be added to it a careful training in the application and use of language, and in the power of verbal description of things in immediate experience or remembered as parts of former immediate experiences. As Mr. Rooper well says: "Speech is a spiritual hand for grasping objects by the mind. . . . Want of language, want of words filled with clear, definite meaning, is the greatest hindrance to culture." [1]

The gaining knowledge by full and careful examination of things and events in immediate experience is, then, the essential foundation of every real system of learning, and unless it is well and truly laid the edifice erected will be a jerry-built structure—unsafe and liable to collapse. And an integral part of such examination of experience is the development of the power to use language accurately, clearly, and precisely.

We see, then, that lessons which aim at increase of information are of two main kinds—those which directly examine and study things and events, and those which do so at second-hand through the words of others. Both will go on throughout the school, but it is evident that the proportion of the latter to the former will increase as the pupils advance in age, in knowledge, and in command over language.

Direct Study of Things and Events.

To the former class belong object lessons, nature study, out of doors study of geography, the first study of number, study of historical remains and of works of art. The mode of teaching is obvious. It must bring every pupil into direct relation, through the appropriate forms of activity, with the qualities of the things dealt with. In so far as this is not done the lesson resolves itself into one which conveys information through words. For example, weight

[1] *School and Home Life*, p. 98.

can only be directly apprehended by lifting, texture or temperature by feeling, flavour by tasting, and so on. Merely to talk of these qualities as belonging to an object which the pupils only *see*, is not to give direct experience of them. The teacher's work is, then, in the first place to secure that such examination is well and thoroughly made, and in the next place, to ensure that each pupil can express the results of his observations in clear and copious language. In all such work it must be borne in mind that mere cursory notice such as a child spontaneously gives to objects which attract him is not sufficient. He must really *attend* to them, which implies that each must be kept under examination a considerable time, and considered in its relation to some purpose of active doing or thinking, return being made to it again and again. "Let the child see what part the object plays in its usual surroundings, and dwell upon its material, its origin, its use, its hurtfulness, its opposites, and its resemblances."[1] In a word, to be of worth such teaching must be thorough, and can only be effectively given by teachers who have a copious, exact, and sympathetic knowledge at first-hand of the subjects they handle. The too common notion that it requires very little knowledge to give a successful object lesson to young children is utterly mistaken and productive of much waste of time and of much youthful distaste for learning.

Upon the foundation thus laid in an examination of immediate experience the whole of the superstructure of knowledge has to rest. It is evident that many facts are equally well learned from others as from personal observation. Nothing would be gained, for example, by letting a boy discover that Ireland is an island by walking round it, and evidently much time and energy would be lost. So it is with

[1] Rooper, *op. cit.*, p. 100.

the majority of facts. Indeed, it matters little, if at all, how we get hold of a fact so long as we apprehend it clearly, accurately, and completely. All facts in history, most of those in geography, in natural history, and indeed in every department of knowledge we have to take on trust. That is how the individual makes use of the labours of others, and consequently how general knowledge grows.

Oral Teaching. Communication from others is made in two ways—by word of mouth and through the printed page. Of these the former evidently comes earliest in school life: children can understand speech before they can read. Moreover, oral teaching has an advantage which is important with young children. By encouraging the pupils to ask questions, and by occasionally questioning them, the teacher can make sure that they apprehend clearly what he is telling them. The teacher should, therefore, cultivate the power of effective and vivid narrative—terse and pointed and clear; in short, a good English spoken style. Nor should he be afraid to use it. There is an unhappy tendency in English primary schools to contemn such narrative as 'lecturing,' and to try to teach everything by questioning. Now, questioning certainly has its place in teaching, and we shall deal with it later on; but no questioning can put into people's minds facts which were not there before. And in the kind of lessons we are now considering increase of knowledge of facts is the very object of the teaching. Let the teacher, then, tell a story as a story—say a piece of history, or an account of foreign lands, or whatever it may be. Let him illustrate with suitable pictures, specimens, and blackboard sketches—anything which will add clearness and vividness to the ideas he is raising in his pupils' minds. But let him not overdo this. To 'illustrate' what is already clear and vivid is to waste time; to show a picture of what should be left to

the unaided imagination of the pupils—many a poetical image, for example—is to do for them what they should do for themselves and therefore to hinder their education; to overcrowd a lesson—say one on a foreign country—with pictures or lantern slides is to bring confusion instead of clearness into the ideas the pupils carry away with them. In short, in illustrations, pictorial or verbal, as in other adornments and luxuries of life, a wise economy is needful.

But the teacher must not be content to talk, no matter how well he does it. The pupil's mental attitude when absorbing new knowledge of fact is, and should be, receptive, and that whether he is observing objects for himself or listening to the words of his teacher. But it should in no case be passive. When the pupil is observing facts for himself he is first taking the object to pieces mentally and then putting it together again. When he is listening to descriptions or narratives, the putting together of the new facts he is learning is equally important. The teacher will, therefore, pause at appropriate places, and in some suitable way secure that this is done, often placing the results on the blackboard in some brief form of summary. And at the end of the lesson, or at a subsequent time, he will call for some form of systematic reproduction. The worst and most ineffective way of doing this is, as soon as the narrative is over, to ask the class a number of petty questions. Individual pupils answer the questions, but nothing is done to lead any pupil to think over and put together for himself the contents of the lesson. To have a brief talk on the main points and their connection, to throw its results into the form of a summary, and to follow this a day or two later by a written composition, is a much more effective mode of proceeding with the older pupils, whilst with the younger it is well to train them to

give individually complete reproductions in fluent and correct English of the substance of what they have heard. If they are interested in the subject quite small children do this readily when encouraged to do so. It is the teacher's faith in the fatal heresy of the supreme value of questioning which so often destroys this power in the pupils as they get older, so that one of the chief characteristics of many primary schools is the inarticulateness of the scholars.

Learning from Books.

But it must not be forgotten that teaching in school should always develop and train in the pupils the power of learning for themselves. Lessons of direct observation of the things which surround us do this, but oral lessons do not directly do it at all, and, if too extensively used, may even atrophy the capacity. After the pupil leaves school the one way of getting information at second-hand commonly open to him is by reading books. And to read a book so as to extract its essence and pass by what is not of worth relatively to our needs is a work of skill. This skill it should be one of the chief objects of the school to train. Like every other power it can only be developed by right practice. How can we expect young men and women to read intelligently what is worth reading if they have never been taught how to do so at school? Such teaching is not given by the ordinary lesson in reading aloud, the aim of which is always mainly, if not altogether, elocutionary. By the excess of oral lessons children are so trained to rely on their teacher for new information that they know not how to get it in any other way. One of the greatest reforms needed in our primary schools is the substitution to a very considerable extent of the reading of well chosen text-books for oral lessons. "No education seems to be worth the name which has not made children at home in the world of books, and so related them, mind

to mind, with thinkers who have dealt with knowledge. We reject epitomes, compilations, and their like, and put into children's hands books which, long or short, are *living*. Thus it becomes a large part of the teacher's work to help children to deal with their books; so that the oral lesson and lecture are but small matters in education, and are used chiefly to summarise or to expand or illustrate."[1] In this passage Miss Charlotte Mason states not only the principle we are urging, but also the practice adopted for some years past with the greatest success in the *Parents' Review* School at Ambleside.

Doubtless, at first the pupils need a good deal of help in reading a portion of a book: it must be indicated what they are to look for, how they are to distinguish the essential from the less important, and how they are to organise and systematise what they have read. Care has to be taken that they do all this intelligently and do not make the work a mere memory of words, which is the danger to which this form of learning is most open; though it may well be doubted if even this is so serious an educational mischief as the desultory habit of mind, the slurring over of obscurities, and the shirking of difficulties which is the regular outcome of excessive oral teaching. A few broad and suggestive questions, written down before they begin to read and the answering of which involves a digesting and re-arrangement of the subject of the chapter, put the pupils on the right road at the beginning. At the end a talk with the teacher over what has been read should guide them in that organising of new matter with old which is necessary to secure every advance in knowledge. Such a talk should neither be allowed to degenerate into a mere examination into what is remembered nor into an informal chat over trivialities. In it the

[1] Mason, *School Education*, p. 226.

teacher should aim at developing important points, at illustrating others, and at leading the pupils to make inferences and draw conclusions from the matter read, and themselves to seek for analogies and illustrations from other sources. The reproduction of the substance of what has been learnt either orally or in some form of written composition completes the work. Such reproduction may take many forms, and the more variety the teacher can introduce into it the more stimulating is the exercise. But all such forms fall into one of two broad classes—reproduction in full of the whole or part of the matter studied, or reproduction in brief summary of the important facts, arranged with reference to some definite point of view. In either case the line to be taken in arranging the reproduction is often best indicated to the pupils by a broad question.

Of course, this mode of learning can only be gradually substituted for oral teaching as the children attain mastery over the mechanical difficulties of reading. But approaches to it, though gradual, should be steady, and in the upper classes it should be the customary mode in which the pupils acquire new information. Needless to say, the books used must be carefully selected, so as to appeal to the pupils and awaken that sympathy with learning of which the germ exists in every human mind. They should be such as to require the young readers to put forth their best efforts, yet not so hard as to render those efforts unavailing. Above all, the mastery of them should be set before the pupils as a privilege to be valued and sought after and not as a hated task to be imposed and enforced by penalties. Here, as elsewhere, it depends mainly on the teacher's tact whether the pupils' attitude towards their lessons be one of attraction or of repulsion.

Lessons which aim at increasing Depth of Knowledge.

8. In the type of lessons we have just considered the pupils are engaged in entering into their intellectual heritage by extending the width of their knowledge. Their mental attitude is receptive, and their minds are engaged in perceiving what is present to their senses, in imagining what is described, and in remembering in an ordered manner facts of which they have in these ways become aware. To some extent they reason on these matters of fact and relate them to each other. But the relation is mainly superficial; it is usually one of time when the facts have been received through narrative, or one of place or similarity when they have been apprehended through direct experience or through description.

It is obvious that such reception of knowledge is an essential element in the development of mental life: it is the food on which thought feeds. But knowledge is not completely knowledge whilst it remains in this mainly empirical form. Facts must be sifted and analysed, and the deeper relations of identity of nature and of causation which make them parts of an organic whole must be ascertained. This is essentially the work of science, and in it man has, as yet, made but little headway in comparison with what has to be learnt, although when viewed in relation to the total ignorance from which he started his progress seems enormous. It has been so great, at any rate, that no student attempts to know all science; specialisation is more and more the mark of scientific workers.

It is, then, abundantly evident that school children cannot advance far along the paths of science. Still more evident is it that even the little progress they can make is possible only under skilled guidance. But however small the progress may be, it should be real. And this implies that the pupil investigates for himself, forms and tests his own

conclusions. The object is not to add to the width of his knowledge, but to increase its depth. He may incidentally become acquainted with facts of which his notions have hitherto been so hazy that he can hardly be said to have known them at all, but his main purpose is to understand more about the nature and relations of facts with which, as facts, he is more or less familiar. His mental activity is, therefore, conceptual, and his mental process is one of reasoning and invention.

Obviously such lessons react upon lessons of the kind we have already considered. Facts which have been analysed are ever after more full of meaning than those which have only been perceived. But in the primary school the two kinds of lessons are mainly in different branches of knowledge, because there are few subjects of which the facts are either simple enough or sufficiently under command to make conceptual analysis possible to children. Thus, history and descriptive geography remain for the primary school mainly on the perceptual level; while mathematics and the simpler relations of physical science admit, more or less, of conceptual treatment by the pupils.

Steps of Method.

The method of conducting lessons in which conceptual analysis is the chief form of mental activity should obviously be an application of the methods of inductive science.[1] Of course, these cannot be adopted in their entirety, for ignorant school children cannot approach any subject in a mental condition similar to that of the pioneers of science. Though such methods may be called 'heuristic,' the pupils are in a very different position from that of original discoverers. The essential differences are that, as a rule, they cannot select their own matter for investigation, and that they have a

[1] *See* Welton, *Logical Bases of Education*, Chaps. X. and XVI.

very inadequate conception of what constitutes proof. Nor can these defects be avoided, for they are inherent in the immaturity of the pupils both in knowledge and in power. But with these very considerable reservations the pupils should be independent investigators. Their attitude of mind should not be one of receptivity, but one of active inquiry and criticism.

i. Apprehension of Problem.

In order that this may be secured each lesson should begin with suggesting to the pupils that there is a problem to be solved. Of course, the teacher selects the problem, and he arranges the facts so as to make that problem stand out clearly. The kind of problem is, thus, suggested to the immature pupil much more explicitly than the chaos of nature offers problems to the scientific discoverer. Now a problem is a direct challenge to an active human mind: consequently, an adequate presentation of a problem is sufficient in itself to excite in the pupils a desire to solve it. But its nature is only clearly apprehended when the facts which suggest it have been carefully examined. Before a solution can be attempted a clear idea of what has to be solved is essential.

ii. Suggestion and Testing of Solutions.

When this has been done, the pupils should suggest any solutions that occur to them. Many of these solutions will appear to the teacher absurd, but it should be remembered that in all scientific discovery the line of advance is marked by the corpses of rejected solutions and theories. A solution which seems ridiculous to a teacher may well be reasonable to a pupil, and it must be borne in mind that the chief value of lessons of this kind does not lie in the accuracy of the solutions reached so much as in the process of reaching them. When a pupil offers a solution, therefore, he should be required to suggest a way in which it

may be tested. Often the mere consideration of the consequences of a solution will show that it is inadmissible, in that those consequences would conflict with known facts. But in other cases the matter has to be brought to the test of experiment, and often after trial the proposed solution has to be rejected. In other cases one solution will appear at the end more probable than any other which has been suggested, but, at any rate in physical science, progress will rarely go beyond this.

iii. Formulation of Theory.

The outcome of testing the various solutions which have been offered may, indeed, not be reached in the lesson in which the problem was stated: well, indeed, is it when the active resourcefulness of the class is so great that it is not. But at the end some one solution will hold the field, a solution which in extreme cases the teacher himself may have been driven to suggest, though when this is so he should be careful not to assert it as having more intrinsic authority than those of the pupils. And, obviously, this should be a last resort. The surviving solution should then be clearly formulated, and the evidence examined to see with what degree of confidence it may be accepted. This step may not take long, but it is of the utmost importance.

Now all this may seem a very slow advance and one which reaches but an unsatisfactory result. From the point of view of knowledge both these charges must be granted. But educationally these are exactly the features which give the lessons their chief value. For such learning should, above all, bring home to the pupils that the attainment of new knowledge by oneself is a slow and arduous task, and one in which many disappointments must be expected, and many mistakes will be made; that every proposed solution must stand or fall by the tests which can be applied to it; that one must not jump at

conclusions nor claim certainty where the evidence which can be apprehended only justifies some degree of probability.

When all these points are secured the pupils may often with advantage be told that people wiser and more learned than they are have accumulated, by means beyond their skill to employ, much more evidence than they can apprehend, and that this evidence shows that the conclusions the pupils have reached as more or less probable are really practically certain. This because, after all, one of the objects of teaching is to lead the pupils to grasp the truth so far as it is known.

But it should be recognised clearly both by teachers and taught that such truth is given and received on the authority of others, and is not the outcome of the investigations just concluded by the pupils. It is, indeed, the failure to recognise this which makes so much of the teaching of science to young pupils not only ineffective but positively mischievous. By an excess of guidance in the form of suggestion and leading questions the teacher keeps the pupils from going astray, and they are allowed to enunciate as the result of their observations a universal law—true in itself it may be, but absolutely unjustified by the evidence before them. Thus a superciliousness, a self-conceit, and a self-sufficiency are cultivated which is out of place everywhere, but especially in the young, and which is as far removed as it possibly can be from the attitude of mind of the true discoverer. That is marked by the humility of knowledge; this by the dogmatism of ignorance.

Throughout the investigation, each solution has been tested by its application to actual fact, and, of course, the victorious solution has been thus applied as well as others. But it is well at the end for the pupils to seek for other forms of application, so that the width and explanatory

power of the theory may be brought home to them. In many cases, as, for example, in arithmetic and geometry, this needs separate lessons, of the kind we shall discuss in the next section, and the process of thought is always of the nature we shall there describe.

iv. Application of Theory.

It is evident that the progress of a lesson in which the pupils' thoughts take the lead is much less under the teacher's control than is that of one in which he presents the matter in an ordered sequence determined by himself. The attempt to attain the same regular method in this essentially different type of lesson absolutely destroys its value, for then the pupils are prevented from going wrong. But real progress in conceptual analysis is normally made by first making a mistake, then finding out it is a mistake, and finally rejecting it, whilst from its ashes springs another and more promising attempt.

Absence of Rigidity in Method.

The fulness with which such methods of learning can be adopted depends on the advancement of the pupils relatively to their various branches of study. In mathematics and language a good deal can be done with pupils as young as ten or eleven. In subjects whose data are more complex advance is naturally slower. The only general rule is at once positive and negative—to cause each pupil to advance in conceptual analysis as far as he can, but not to attempt to force him beyond the point at which his thought works surely and successfully. The great danger to be avoided is an appearance of advance in mental power without the reality—a mere sham, which often deceives both teacher and pupils.

Use of these Methods.

The essential thing is that the pupils make all the inferences for themselves, and any procedure on the teacher's

part which secures this end is justified. Broadly, it may be said that the matter dealt with is of two kinds, that which can be entirely or mainly dealt with mentally and that which demands, in addition to mental analysis, some amount of manipulation of certain matters of sense experience.

Modes of Learning and Teaching.

Questioning.

In the former case, the function of the teacher is to suggest lines of thought, but to avoid suggesting conclusions. A kind of stimulating interrogation which leads each pupil to develop the line of reasoning the class is pursuing in common is the most effective instrument with young pupils. With older pupils it should generally be possible to put the problem before them, leave them to attempt test solutions of their own, and then discuss the results with them. This is a mode of promoting learning obviously analogous to that of using text-books, which was discussed in the last section.

The power to question well is one of the fine arts of teaching, and, like other fine arts, it can only be perfected by much practice. But such practice may with advantage be criticised by careful reflection after each lesson, and it is in such criticism that the rules of questioning commonly given in books on teaching are useful. After a lesson a teacher may profitably ask himself whether his questions were calculated to stimulate thought, to suggest problems without suggesting solutions, to give the minimum prompting required to carry on the lesson, whether they grew out of the pupils' answers so as to make the whole conversation between teachers and pupils a true cooperation and a real advance, whether they were clear, definite, and well expressed. This noting of faults may help in the attempt to avoid them in the future. But improvement cannot be made by trying to keep such rules in the mind when talking with the class. Then the teacher's attention

should be fixed on the relation between subject-matter and pupils. He should be clear as to what he wants to ask, and keep in close touch with his pupils' minds; beyond that he should trust to a cultivated habit of clear expression of thought. One questions, indeed, as one talks. Good questioning, like good exposition, is the outcome of habits of clear thought and precise expression. And precise expression can only be successfully attained if it is cultivated in speech generally and not merely in interrogation in school. Here, as elsewhere, general life habits dominate school work.

Experimenting. In lessons in which the testing of suggestions involves the manipulation of physical objects the essential point to secure is that the pupils invent what is to be done. Only so can they be said to make an experiment. Whether teacher or pupils do the actual manipulation is a matter of minor importance. It is true, indeed, that some first-hand acquaintance with apparatus is necessary to bring home to the pupils quite clearly the actual conditions under which experiments are worked, the need for exactness and care, and the difficulty of securing just the conditions desired. But this may easily be carried to excess, under the belief that children understand an experiment better when they manipulate the apparatus themselves. This is not necessarily the case, and, moreover, not mere understanding but origination is what is wanted. So that in many cases it is better for the teacher to work the experiment under the direction of the pupils, taking care that they can clearly see each step. In this way the attention of the pupils is less likely to be distracted from the purpose and intention of the experiment to mere accidental conditions and accessories. Moreover, as the apparatus is manipulated more skilfully the test of the suggestion

is more satisfactory, and the whole class is advancing in the test at the same rate, and that more speedily than would be possible to the pupils if working by themselves.

Thus, the educational advantages may be greater when the pupils simply direct and watch an experiment than when they both plan and carry it out. They are certainly greater than in the common practice, in which the teacher plans and directs the experiment and the pupils do nothing but the manual arangements. The value of such lessons is limited to the training they give in manual dexterity; of the intellectual benefit of experimenting they have not an atom. This is recognised to be the case, even with students of University age, by so great a scientific authority as Sir William Ramsay. He writes: "In my opinion, far too much stress is laid, now-a-days, on what is called 'practical work.' To take my own subject, it is possible to have quite an intelligent idea of chemistry, without ever having handled a test-tube or touched a balance. Lectures on chemistry may be well illustrated experimentally, and the necessary theories demonstrated by the lecturer. Of course, that will never make a chemist; but we are not talking of making chemists, we are discussing the best way of giving a general education, and I maintain that to spend several hours a day in practical work is, if not a waste of time, at least a work of supererogation."[1] If this is true with respect to young men it is certainly not less true in the case of school children, whose want of manipulative power makes the possible waste of time much greater.

Lessons such as have just been considered are very different in conception from many of those commonly called 'heuristic.' A confusion seems all too common between the discovery and observation of facts and the

[1] *University Review*, vol. i., pp. 356-7.

conceptual analysis of them. Hence, it seems frequently to be thought all important that children should discover their own facts; the use they then make of them afterwards appears to be considered of very minor weight. So the teacher is careful to cause his pupils to do their own observing, but he quite complacently draws their inferences for them, if not altogether yet in the greater part. He may, indeed, lead them to take individual steps in reasoning, but the guidance of the whole process he keeps in his own hands. He does not allow investigation of wrong suggestions; indeed, he seldom asks for a suggestion till the end of the lesson, when he calls for it as a 'generalisation' from what has been observed. On the contrary, we have urged that the whole lesson should be an attempt by the pupils to work out their own suggested explanations. It is certain that only in this way will they get even a glimmering of a true conception of scientific method, for nothing more unlike the actual way in which discoveries of the secrets of nature are made than the usual 'science' lesson can well be imagined.

The Essence of Heuristic Methods.

Lessons which aim at Applying Knowledge.

9. It has been said that every theory—or general mode of solution of a problem—should be applied as widely as possible. This is quite as essential a step in learning as is the discovery of the theory itself. For theories are abstract statements of relations: and a relation has value in the structure of knowledge only so far as its range is apprehended, or, in other words, so far as we know the kind of things whose connection it expresses. The mental activity involved in applying a theory is conceptual, like that involved in arriving at it, but obviously the end of the latter process is the starting-point of the former. The direction of the thought is essentially deductive and

synthetic instead of inductive and analytic.[1] Not that the two forms of inference are ever entirely separated. As has been seen, in the inductive process every suggestion has to be tested by comparison with facts of the results which can be deductively inferred to follow from it. So in all deductive application of rules, principles, and other theories, it is necessary to analyse the cases to which we apply them in order to isolate in thought that aspect of the concrete thing or event to which the particular theory is applicable. For it must be remembered that no one theory explains every aspect of any concrete experience.

Steps of Method.

In lessons, or parts of lessons, then, in which the aim is to see the bearings of the general and abstract knowledge which has resulted from lessons of the kind last considered, the general order of thought will be deductive, though it will not naturally be expressed in any of the traditional syllogistic forms. These, indeed, result from a logical analysis of thought into its elements, and are not a psychological expression of the order thought consciously takes. But the essential elements signified by the terms 'Major Premise,' 'Minor Premise,' and 'Conclusion' will be present.

i. Formulation of Principle.

The first step, then, will be the clear formulation of the general principle which is to be applied—the major premise as logic calls it. If this was arrived at in some previous lesson it will be well to review briefly the evidence on which it is based, so that it may be certain that the general statement has not become a mere form of words.

The next step is the determination of the direction in which this principle is to be applied—the logical minor premise. All general principles, rules, and other abstract

[1] *See* Welton, *Logical Bases of Education*, pp. 119-135.

statements of relation are applicable in a variety of ways, and it is well in teaching to deal with these separately. In working out the applications by deductive reasoning it is easy to slip in unconsciously some other assumption. It is well, then, to examine carefully the whole process of inference when it is completed in order to make explicit any such implicitly made assumptions. Especially is this necessary in demonstrative geometry, where axioms and postulates are apt to be assumed quite unconsciously.

ii. Form of Application.

Finally, the results of the inference should be tested by that form of appeal to experience which is appropriate to the matter in hand.

iii. Verification.

As in all lessons which exercise conceptual activity, the essential point to secure is that the inferences are made by the pupils themselves. To follow the inference of another is to accept knowledge at second-hand. Such may be necessary at times, for to understand a demonstration of some matter in relation to one's life is better than to be ignorant of it. But in so far as this is done the lesson falls under the first class we considered. The only value it can have from the point of view of the kind of lessons we are now considering is that it may serve as a model on which future attempts at inference may be based. In itself it has not developed the power of reasoning, but only the lower power of understanding. The pupils' minds have been receptive, whereas in inference they are searching and critical.

Modes of Learning and Teaching.

As in this respect the aim of this kind of lesson is the same as that of those we last considered, it follows that the modes of stimulating learning to which the teacher can appeal are essentially similar. Of these, then, we need say no more than to insist that questions which suggest

conclusions are fatal to any attempt to secure the right mental activity in the pupils.

Lessons which aim at developing Constructive and Executive Skill.

10. The last broad class of lessons consists of those in which the result aimed at by the pupils is material, though the teacher, of course, regards the attainment of that result as incidental to some mental benefit to be derived by the pupils. But the pupils' purpose is emphatically to learn to do something and to show some visible result of their doing—to deal in some effective way with some part of their physical surroundings. All such doing is based in the first instance upon imitation, and whatever constructive originality may be afterwards attained will be found on examination to be imitation modified to meet new circumstances. Individuals are naturally endowed in very various degrees with the practical intelligence which makes appropriate and complete such modification to meet new conditions. But whether the innate capacity be small or great training helps to develop it.

Such training is not mere practice. It involves an analysis of purpose and process, leading to the formulation of general rules of doing—or principles of the art or craft dealt with—similar to that by which general theories of knowledge are attained. But there is the important difference that in drawing out general rules of constructive physical activity much more may be done by the teacher than is permissible in the other case. For here such principles are instrumental, whereas there they were the goal aimed at. Moreover, in the application of these principles the test is rather conformity with recognised canons of taste than simple agreement with fact. Here again, then, the teacher has a part to play which has little analogue in the lessons of application considered in the

last section, in that he is to the pupil the ultimate judge of beauty, appropriateness, and taste. Whilst, then, in lessons of this kind the pupils are most obviously engaged in independent physical activities, yet their attitude of mind should have a larger admixture of receptiveness and docility than is desirable in lessons in which their activity is conceptual.

Steps of Method.

For the effective use of physical activities it is necessary that the purpose to be attained be clearly apprehended. It is essential, in the next place, that the possibilities of that form of active dealing with physical things should be recognised, so that the means adopted to reach the desired end may be suitable. And, lastly, there must be ability to judge how far the end has been attained, and in what directions any required alteration should be made. The steps of method in lessons of this type should, therefore, satisfy these conditions.

i. Analysis of Result to be Attained.

In the first place, there must be a clear apprehension of the result it is desired to attain. This result may be the copy of some process or result set before the pupils for imitation, or it may be the invention of some new process or result to suit certain given conditions. In either case there must be an analysis of this desired result: in the former, a perceptual analysis of the object or process; in the latter, an analysis in imagination of the conditions to be met. The results of such analysis may often be usefully formulated in a general rule or principle.

ii. Expression and Criticism.

In the next place, there must come the determination of means and the actual doing. In all lessons of imitation, of course, the means are given as well as the result, but in lessons of origination the determination of means is essential. For

example, if the pupils are set to make an artistic design, the purpose to which the design is to be put must be clearly apprehended, and must determine the material in which it should be expressed. These two considerations conjointly should suggest the kind of design which is appropriate, and only by this twofold appropriateness can its value be tested. The means being decided upon, the actual execution takes place, and of course this should be attended, step by step, with criticism of the result so far attained, and with consequent alterations where desirable and possible. And when the whole is finished, a general review and comparison of results with original purpose should be made.

Modes of Learning and Teaching.

In lessons of this type the teacher should have little or no difficulty in arousing desire. The wish to do things and to do them well is inherent in children, and is only crushed with difficulty even by such mechanical and deadening exercises as are supplied by so many of the drawing exercises traditional in our primary schools. The other functions of the teacher are to lead the children to analyse the object of which they are to produce a copy, to formulate any general principles of construction that may follow from such analysis, and to help the pupils to pass just criticisms on the results they have achieved. In all this his work should be as suggestive as possible, so as to cultivate gradually in the pupils the power to dispense with such guidance, though he should not hesitate to express clearly his own opinions on matters of taste and beauty, showing, as far as possible, the considerations on which his judgments are based. But it is evident that the learning must be mainly through the actual practice of the appropriate activities, and, consequently, the teacher should reduce the oral part of such lessons to the smallest limits consistent with effectiveness.

Summary.

11. These, then, are the main types of lessons. But the classification must not be pressed too rigorously. Examples of several forms of learning may well come in single lessons, and some lessons do not fall exactly under either type though they may approximate to one. Such, for instance, are many lessons in literature which appeal to the imagination, the taste, or the emotions, rather than to the intellect. These approach sufficiently near to lessons of the first class for what was said of them to be broadly applicable, but there will be many differences in the details of treatment if the different mental effect is to be produced. Such classification of lessons, then, is intended merely as suggestive.

The essential differences in the processes of learning are those which mark off the perceptual from the conceptual activities, and these demand, as has been seen, different attitudes on the part of the pupils towards knowledge; in the former case receptive, in the latter inquiring and critical. Of course, even this is not absolute; a child may well inquire after facts and seek to find new ones, but in the presence of the fact he must be willing to accept it for what it is; in a word he must be docile. Constructive activities are perceptual in their execution, but in their origin they may be either perceptual or conceptual. In the former case, again, the mind is receptive and docile, attempting to imitate as closely as possible a given model. In the latter case the result to be realised is constructed by the mind itself by imagination working on the results of conceptual analysis, and the executive process is an attempt to give expression to this original idea; here the mind is the faithful executant of its own ideal constructions, it copies indeed, but it first supplies the model to be copied.

CHAPTER IV.

THE TEACHING OF ENGLISH: PREPARATORY.

Functions of Language Teaching.

1. As the aim of education is to lead the young into true and faithful relations of knowing, feeling, and acting in the world in which their lives are to be passed, so everything which is taught them in school must be justified by a consideration of the part it plays in this general process.

Language as an Instrument of Thought.

When this test is applied it becomes evident that language is the most fundamental and one of the most universal means at the disposal of the educator. Without some system of significant signs that general or conceptual thought, which organises our experiences so as to make them intelligible, would be impossible. Without such signs man could never rise above the intellectual level of the beast; his life would be a mere series of perceived happenings, very imperfectly held together here and there by vaguely apprehended bonds of habit, but in no sense understood, and consequently in no sense fitted to guide conduct in new circumstances, or to help the individual to improve the conditions in which he lives. Everything that is characteristically human in life is, therefore, dependent upon the use of some form of language, for language is essentially a system of signs by which experiences can be

marked, examined, recalled, classified, and generally made more or less systematic.

Language as an Instrument of Common Intellectual Life.

But we must go further. It must be remembered that human life is essentially social. A man does not originate his thoughts and live his intellectual life cut off from his fellows. On the contrary, he lives in free interchange of ideas with them, an interchange in which even the most gifted individual receives much more than he gives. For he receives the results of the accumulated experiences of the ages, and in them he finds the inspiration of any addition he may make to human wisdom or to human knowledge.

Such community of intellectual goods is rendered possible only by a common language. Were the whole world to speak one language, then doubtless increase of human knowledge would advance more rapidly than it does, for the time now spent in acquiring foreign languages could then be given to the mastery and utilisation of ideas. The plurality of the languages of civilisation renders it obligatory on all higher schools to teach their pupils some of these means of entering into the thoughts and lives of other nations. But in the primary school this problem does not confront us. The brief duration of that school life confines us to the mother tongue, and indeed those whose formal instruction ceases at fourteen years of age have much more of the thought and experience of mankind accessible to them in their mother tongue than they are likely to assimilate.

Reasons for Teaching the Mother Tongue.

It may be urged, however, that there is no need to teach the mother tongue, because it is necessarily acquired in the ordinary intercourse of life. Even when this has not been advanced in theory it has frequently been acted on in practice, and that in English schools of all grades. But

when we consider what is involved in the conception of language as an instrument of culture—that is, of ability to share in the best thought of man—we must acknowledge that the ordinary intercourse of life does not secure a sufficient development of that instrument. For, surely, it must be demanded that language should be both copious and exact. If it is not copious, the mental life is starved, for the greater number of men's thoughts are unknown and must remain unknown to one who cannot understand the terms in which they are expressed. If it is not exact the mental life is largely sterile. Confusion of speech implies confusion of thought, for we generally think in words, as well as use words to express our thoughts to others. He who has no clear and definite meanings behind the words he uses has vague and confused thoughts himself, and can only attain a vague and confused idea of the speech of others, for that speech conveys to him exactly what the ideas it calls up in his mind are worth to him. From such confused thoughts no fruitful new thoughts can issue.

Increased Mastery over Language.

This being so, surely it cannot be maintained that definite instruction in the mother tongue is not needed, for it would be hard to deny that the speech of many, if not most, people is both restricted and slipshod. When we compare the four or five hundred words which form the common speech of the uneducated with the fifteen thousand words or so of which Shakespeare's vocabulary consisted, we see how little the unconscious picking-up of language by imitation of those around him will do to enable a child to read with any understanding works expressed largely in what is to him a foreign tongue. We are always apt to be misled by general terms. Because 'English' is a common name for the meagre and slovenly

speech of ordinary intercourse, and for the language of some of the greatest writers the world has seen, we are too ready to assume tnat all who can use English in the former sense can understand it, even if they do not use it, in the latter. This is a profound mistake. Literary English is practically a foreign language to a large number of English people. It is not only that many of the words used convey little, if any, meaning to them, but that the constructions are so unfamiliar as to be nearly or quite unintelligible, and, above all, that the trains of thought are far more continuous than any to which they are accustomed in ordinary life.

It follows that the school must teach the mother tongue, remembering that it is largely an unknown tongue to the pupils, and that unless it is mastered to some considerable extent, nearly the whole realm of literature is closed to them. When the pupils leave the school it is absurd to expect them to find enjoyment in books whose language they have but very imperfectly mastered. Still more absurd is it if their whole contact with books has been such as to convince them that the reading of books is a repellant and utterly uninteresting task. And although there has been considerable improvement in school reading books of late years, yet it remains true that many of those still used in school can be expected to fulfil no other function than to disgust their readers.

This has led us to a further aim the school should have:

Cultivation of Interest in Literature.

It should try to rouse in its pupils an interest in literature, and to give them knowledge of where and how that interest may be satisfied. The reading of good literature is one of the best and most easily accessible modes of employing the leisure time of life, a time which the working classes are rightly striving to increase in amount, but

which, when badly employed, is no blessing, but a curse. The most severe condemnation which can be passed on any school is that it sends its pupils out into the world with no tastes developed and no habits formed to lead them both in the present and in the future to employ their leisure hours in a manner worthy of rational and civilised beings.

Foundations of Language Teaching.

2. The school, then, must seek to train its pupils in both the closely related functions of expressing clearly their own ideas and of understanding the expression of the ideas of others. Its general method of doing this should be a development of the process by which the child learns the language of ordinary intercourse. Reduced to its simplest terms, this is that some more or less clearly apprehended idea is connected with its appropriate verbal expression, and that a desire to produce that expression arises and starts an imitative process which is persisted in until the point is reached where the child's verbal expression is understood by those around him. Reception and imitative expression go hand in hand, and each is dominated by desire and interest. For it is not every portion of the speech of those around him that the child tries to reproduce, but only those portions of it which relate to experiences which interest him and which he desires to repeat or to avoid.

When school teaching begins the young child has already taken the first steps in the acquirement of language. But it is evident, first, that his ideas are vague, imperfect, and not infrequently inaccurate as well as extremely limited in extent, for they refer only to those things which interest him, and the baby is interested in but few things. Secondly, it is plain that his vocabulary is, and must be, equally inexact and meagre. And thirdly, it is found that his utterance is also more or less imperfect and

inexact. This last named characteristic is due to two main causes. He has not yet learnt to co-ordinate properly the movements of the various organs employed in speech, and he has not done this even as far as is physiologically possible to him, because those around him have accepted his baby utterances as correct, and have even encouraged his imperfections of speech by making his prattle the common mode of talking to which his attention is drawn.

Language Teaching in the Infant School.

3. It is not our purpose in this book to discuss the work of the infant school,[1] but it is necessary to understand its general aims and character in order to make the work of the upper school a natural development of it. Now, in the teaching of language the essential work of the infant school is to increase at once the range of ideas and of vocabulary, to secure that the ideas gradually grow in clearness, and that there is a corresponding improvement in the accuracy and exactness with which speech is used, and at the same time to improve articulation and pronunciation.

Increase in Power of Speech.

The great means for securing these results is talking. The understanding and the use of speech should have made very considerable advances before reading and writing are begun. Every lesson in the school, nay more, every piece of intercourse of whatever kind between teacher and pupils, is a lesson both in the understanding and in the use of speech. And it should be borne in mind that the former precedes the latter. The baby shows that he understands words before he can use them, and throughout life the vocabulary we can understand is wider than that we

[1] *See* p. 35.

habitually use. The teacher, therefore, whilst always talking in simple language, should not attempt to confine her vocabulary within the narrow limits of the actual speech of her pupils. She should remember that words derive their meaning from the connection and manner in which they are used, and she may and should employ many words which her pupils do not use, only taking care that their reference and meaning stand out clearly. Never should she attempt to teach the meaning of a new word by definition. That is not how children pick up speech. A definition is the end of many experiences of the use of the word, not the beginning thereof.

Bearing in mind that speech is essentially learnt through imitation, the teacher should take care that her own use of words is accurate, exact, and appropriate, and that her sentences and questions are well constructed; in short, she should, as a teacher as well as an individual, strive to cultivate in herself the habit of clear and exact expression. She will not demand or expect that her little pupils shall express themselves as well as she does. She will recognise that in speech as in other forms of human activity, perfection only comes through much practice, beginning at first in crudest imitation, and gradually improving as proficiency is slowly attained. She will give no formal lessons in expression, but she will gently suggest improved forms of setting forth meaning by drawing the child little by little to make what he wishes to say clear first to himself and then to others.

Similarly, she will gradually lead him on to a fuller and fuller expression of what is in his mind, and in that way cultivate in him the beginnings of the power of continuous expression. She will not be keen to mark faults of construction; she may well leave that in great part to the senior

school, but she will aim at securing clearness of arrangement as an essential part of clearness of expression. Her chief aim will be to develop fluency and confidence, and to train in consecutive thought and expression. Every lesson, as has been said, is a means for doing this, and every lesson should be so used. Of course, the continuity of expression attained will in any case be small. The thoughts of little children are fragmentary and incomplete on every subject, and the teacher in these early years tries only to get real childish thought expressed in natural childish language.

It is only natural modes of expression that she will encourage. Hence, though she will train her little pupils to express themselves in sentences when they are narrating or describing, she will carefully avoid the unintelligent pedantry which insists on every answer to a question being couched in a 'complete sentence.' Whether a sentence is a suitable answer to a question depends on the form of the question; to require it at all times is to depart widely from the use of language as a medium for the interchange of ideas. Question and answer frequently express between them but one fact or one idea, and continuity of thought in the child's mind is only secured when the answer he gives expresses the end of the thought which began with his apprehension of the question. To demand that in answer to such a question as, "What do you see on the table?" a child should reply, "I see a book on the table," is actually to hinder, and that seriously, the use of language as a ready expression of thought, for it compels the child to pause till he has arrested his thought, and, as it were, stood it on its head, before he presents it for acceptance. Moreover, can any means be imagined much better calculated to convince the child that life and language in the school are very different things from the real life and language outside,

and so to promote that dislocation between school and life which is the most fatal obstacle to educative effort?

Improvement of Utterance.

The teacher's interest in developing at once her pupils' mental life and their power of expressing it must not, however, lead her to forget that improvement in the mechanism of speech is also to be sought. Continual practice in faulty utterance makes correction of such defects more and more difficult, until their cure becomes practically impossible. In all speech exercises, therefore, the teacher should endeavour to effect a gradual improvement in the clearness and purity of utterance of her pupils. To do this and yet not to hinder the development of fluency, to care for the mechanism of speech without, by interference with its working, clogging the freedom of that working, is one of the fine arts of teaching and the outcome of that sympathetic tact which no text-book can teach. All a book can do is to urge the conjoined aim on the teacher's attention.

In order to train utterance effectively it is essential that the teacher should be at home in the theory as well as in the practice of speech; she should not only herself possess a clear and pure utterance, but she should have studied the mechanism and mode of working of the vocal organs. For the child must learn to articulate clearly and to pronounce correctly by imitation, and early imitation is made more effective when it is possible to copy the process as well as the result. To be able to show a child how to use his vocal organs in order to produce certain sounds is, then, a necessary part of the teacher's outfit.

It is not our function to set forth the theory of utterance: in this, as in other subjects, we must assume that the teacher has the knowledge, and try to suggest how that knowledge may be effectively brought to bear on teaching. Suffice it, then, to say that special attention

should be paid to the mode in which the children breathe, and that short courses of breathing exercises should be frequent and regular parts of the school work. The correct use of lips and tongue in speaking should also receive regular attention. Many of these exercises can profitably be used in common by the whole class provided they are said softly, as they will tend to cure faults of utterance almost universal amongst children. But every district has its own special faults, and to the correction of these more particular attention should be paid. It is not meant that the infant school teacher should endeavour to eliminate such provincial modes of pronunciation as do not render speech indistinct, but that she should note and make a list of those which tend to render utterance obscure. These will generally be found to be connected with the consonants rather than with the vowels, and with the connections of words rather than with the pronunciation of single words. Jingle rhymes bringing in the difficulties over and over again—such as the familiar 'Peter Piper'—and quick patter rhymes are amongst the most effective ways for helping the children to overcome their faults of articulation.

Though much speech drill may be done collectively so long as the groups are small, yet it must be remembered that correction of faults of utterance is as individual as utterance itself. If the group doing collective work is so large that the utterance of any one child is merged in the collective utterance, there will often be children who simply repeat their faults unknown both to themselves and to their teacher. Hence, it is evident that correction of faults of utterance must be largely individual, and must be as constant as the child's speech. In other words, whilst short set lessons on utterance will find a place in the school, yet the function of these is rather to focus and to emphasise

instruction that is going on in every lesson. The teacher will do well to keep a record of each child's individual faults of utterance, and, during the set lessons in speech, to give him special drill in overcoming them. Many faults peculiar to individuals will be found as well as those more or less common to all the children in a class.

Finally, it may be pointed out that the acquirement of skill in utterance, like every other kind of skill, is a gradual process. The teacher, therefore, will not expect immediate perfection, but will be satisfied if her pupils approach continuously, though gradually, nearer to the standard she sets up for their imitation.

Introduction to Literature.

So far we have spoken only of training in language as an instrument of thought and the expression of thought. The higher aim of using language as a means of bringing the child's mind into relation with thoughts and experiences which lie outside his own narrow life must not be forgotten. This is the first function of literature, and even in the infant school literature must have its place. Of course, it will be very simple literature, for it must appeal to the child, though in a sense it takes him out of himself.

The competent infant teacher will have a copious store of fairy tales, of simple verse, and of other forms of literature suitable to very young children, and she will have cultivated the power of telling them brightly and attractively. Such telling of stories and recitation of simple verse, which by its well marked rhythm gives the first feeling for literary form, should form part of the work of every day. The telling of the story or recital of the verse should not be interrupted by explanations or by questioning as to meanings of words and phrases. That is to destroy the whole effect by dragging the child out of the world of fancy and feeling into which the story should

lead him into the dry matter of fact world of dull 'lessons.' The primary appeal of the literature lesson is not to the child's reason, but to his imagination and emotions.

Stories thus told by the teacher may be told again by the children on another occasion, not as tasks but as rewards. And the children may also be encouraged to tell in class stories they have been told at home. Not every story need be new; children love to hear their favourite stories over and over again. Nevertheless, a teacher needs an extensive collection to meet the tastes and needs of children of various temperaments and likings, and to avoid monotony. Some teachers have a natural gift for composing little attractive stories, and this is good. But even then the old stories should have their place; they are the children's rightful heritage. And if a teacher cannot originate a good story she had far better tell one she has read than make up a poor and dull one.

With the very youngest such stories should be told, but as soon as it can be done without losing the interest of the little ones, reading should, little by little, be substituted for telling. For this there are two main reasons. In the first place, the written story has a more perfect literary form than most teachers can give the told story, and the habituation of the children to good literary form should begin early. In the second place, the reading of interesting stories from books is the surest way of provoking in the children the desire to read for themselves.

The early Teaching of Reading and Writing.

4. This leads us to consider briefly the first steps in the teaching of reading. It is customary now to postpone these to a later year of child life than was formerly common, and some even urge the postponement till six or even seven years of age. The reason usually given for this is that the

young child should be occupied with things rather than words—a reason which is altogether beside the mark, unless it be assumed that when once a child begins to read he is going to do little or nothing else. Of course, a child's being able to read need not, and should not, imply that he spends a large part of his time over books or that he ceases to be interested in things and events. To the question of the age at which the teaching of reading should be begun no general answer can be given. Children vary much in the facility with which they develop power in language—a variation partly innate and partly due to their surroundings. As soon as a child has a fair command over spoken language, both in understanding and in employing it, and a desire to learn to read, then the appropriate time has arrived for teaching him. Nor is the learning a task requiring much development of mental power. A child finds no more difficulty in recognising printed words than in recognising other small objects in which he feels an interest. And such recognition is the fundamental fact in reading.

Method of Teaching.

The question of the best method of teaching a child to read is, therefore, simply an inquiry into how best to help him to such recognition. If this were acknowledged many of the disputes about the matter would be set at rest. If once it is grasped that a written or printed word is a thing to be recognised—a picture of a familiar sound—it is seen that the child will set about recognising it just in the same way as he sets about learning to recognise any other new object. And that is by grasping it as a whole, and attaching to it the name he hears other people use in referring to it.

The first steps in reading, as in all other knowledge, are by imitation and the formation of habit. The child learns by imitation to call an object a cat: equally by imitation

he calls a printed symbol 'cat,' and he no more confuses the printed symbol with the object than he does the spoken word. He is quite capable of understanding that we may talk to the eye as well as to the ear. And as by constant repetition his recognition of the object and his power to name it become instantaneous, so similarly by practice does his power to recognise and name the written or printed word. And just as we find that recognition of objects becomes more sure and ready when the child is allowed to draw their forms in his own imperfect way, so it is with the recognition of written or printed words. Such drawing we call writing.

From these general considerations it appears that the method by which the child learns to read is to recognise and name printed or written words by imitation and repetition, and that this process is accelerated when from the first writing is combined with reading.

The 'Letter' Methods.

Whatever method the teacher adopts in teaching, this is, and must be, the method of learning; and, evidently, the best method of teaching is that which most aids and accelerates the natural method of learning. Many disquisitions on methods of teaching the first steps of reading apparently assume that the child approaches the matter in a severely logical and critical spirit. So we have violent tirades against the traditional 'alphabetic' method of beginning with learning to name the letters and then spelling each word, on the ground that the names of the letters when combined do not give the sound of the word. Of course they do not; that never was their function. The letter-names are names of the constituent parts of printed words, and their function is to describe in speech the appearance of a word when written or printed. To object to them that they do not describe the word as

The Alphabetic Method.

heard is no more to the point than it would be to object to an enumeration of the head, body, legs, tail, etc., of a dog, on the ground that the combination of these does not give the dog's bark.

That for centuries children have learned to read when their teacher has followed the alphabetic method is certain. But it is equally certain that no child ever learned to read by that method: he learned in spite of it. The child is not troubled by the supposed logical difficulty that the sounds *dee, o, gee,* when combined do not give the sound *dog,* simply because the difficulty never enters into his head. He is busy learning to recognise the complete word and as soon as he does this the *d, o, g* sink into their proper places as merely names of parts of that complete whole.

The true objection to the alphabetic method is that it is exactly like insisting on a child attending separately to a dog's head, body, legs, tail, etc., before allowing it to apprehend and name the animal as a whole. Thus it hinders the child by making him attend to letters as independent things, when they should at first remain involved in the word, to which as a whole his attention should be given. Just as the differentiation of parts follows recognition of a whole in the case of other objects, so it should be in the case of those objects we call visible words. In the history of mankind it was the same with spoken language. Men could talk long before they analysed their speech into letters. Language was long precedent to alphabets.

Phonetic Methods.

Of course, these objections apply equally to all the various methods of teaching reading which are called 'phonic' or 'phonetic' and which begin by teaching the sounds of letters. These methods are often put forth as both logically and psychologically perfect. They are neither. They are not logically

defensible, because they attempt to reach familiar sounds through those that are unfamiliar and because they confuse the analysis of the visible word with that of the spoken word, and as reading is the connection of these two, the results of the analysis of the one have as much—and as little—right to be made the foundation of the process as have those of the other. They are not psychologically sound, because the child has learnt to say words as wholes, because he apprehends all objects first as wholes, and because the apprehension of parts naturally follows the apprehension of wholes.

That children learn to read when the teacher uses this method is also certain, but, as when the 'alphabet' method is followed by the teacher, the child learns just in so far as he disregards the teacher's method. We do not mean that this disregard is intentional and deliberate, but simply that the child learns to read words just as fast as he apprehends them as wholes.

But when a child in learning to read is made to attend to each letter separately, whether by its letter-name or by its sound-value—which is, of course, to him only another letter-name—its whole energies are directed to connecting a certain utterance with a visible symbol. Consequently, it is common to find in children thus taught a mechanical power of saying words aloud in response to seeing them on a printed page, which is erroneously called reading. A child really reads only when the visible symbol calls up immediately an idea, and it is true reading whether he utters the spoken symbol of that idea or not. All teaching to read by making the child attend to letters and to their combination as a further conscious process tends to produce that very common and very sad result which is often, though absurdly, called 'reading without intelligence.'

It is such objections as these, and not those due to the unphonetic curiosities of English, cogent and unanswerable as they are, which lead us to reject all methods of teaching, alphabetic or phonetic, which begin by compelling attention to the constituents of words before the words are apprehended as wholes.

Place of Phonic Analysis.

We do not say that phonic analysis has no worth It has its place, but that place is not in the first steps of reading. So, too, it is needful to know the names of the letters, though that, again, is not the first step in reading. Whether these names are taught before or after reading is begun matters nothing, so long as they are not referred to in the early reading lessons. It is the same with phonic analysis. Its value is to help in securing correct utterance, and whenever a teacher corrects a spoken word the correction is made by help of the results of phonic analysis. Certain movements of the vocal chords have become associated with the production of certain sounds. When phonic analysis is brought into connection with reading all that is done is to make the letters stand as signs of these movements. Thus, just as when a child can read the word 'stand' the teacher can write it on the blackboard as a sign for a certain movement of the whole body, so, when phonic analysis is entered upon, the letter 'f,' for example, stands for placing tongue, lips, and teeth in a definite relation to each other. Hence, by phonic analysis letters become signs of movements in the vocal organs—movements which are already habitual but which have not hitherto been consciously apprehended in isolation.

This being so, it is evident that the time for phonic analysis is after the child can read a good many words, and that its chief function is to help him to say words as yet unfamiliar in their visible form, and, by saying,

recognise them as signs of familiar ideas. The more automatically this is done the better: the value and success of the process is not in making the so-called letter-sounds—which in the case of consonants are obviously wrong, for consonants have no sound-values by themselves—but in putting the vocal organs successively and rapidly into certain positions. But further, such phonic analysis draws the child's attention more explicitly to the exact form of the word, so that he is less likely in future to articulate it indistinctly or to confuse it with other words similar in appearance. That such confusion is made is one of the arguments brought by those who advocate one or other of the letter methods against the method of teaching whole words from the first. But such mistakes in recognition are to be expected in the early stages. Children make them in all departments of their experience, but nobody seeks the cure in an attempt to compel children to postpone the recognition of an object till they have named all its parts. Why then should we do so in reading?

Summary.

The method of *teaching* reading, therefore, which harmonises with the method of *learning* is one which begins with words, which connects writing with reading, which introduces phonic analysis later as a help to the recognition of other words, and, above all, which continually connects visible symbol with idea, which treats reading, indeed, as the understanding of visible talking.

Whether the first steps be taken with printed letters or script matters not at all. In either case, the children will have learnt to draw the necessary forms in earlier drawing lessons, whether they have been taught to give those forms the alphabetic names or not.

But even with the best and most interesting teacher children soon tire of these early steps in reading, and to

destroy their desire to learn is fatal. That above all must be kept alive. The lessons should, therefore, at first be very short, not more than ten minutes each. But as the process is so much the formation of habit, and as frequency of repetition is one of the most rapid and certain ways of establishing habits, so these very short lessons should be frequent—two or three every day would not be too many. Very few words should be taken in each. They should be words which name objects in which the children are interested, and should be repeated frequently in different connections. So will progress be sure and interest be maintained, not only by the subjects chosen, but by the sense of successful effort felt by the children. The words should not be taken in the order of their length, but in that of the familiarity and closeness of appeal to the children's interests of the ideas they represent. When the teacher proceeds by either of the letter methods length of words is, no doubt, an important factor in his mind. But to the child that is quite unimportant; he recognises a horse or a cow as readily as a cat or a teacup. Indeed, long words have a noticeable attraction for children so long as those words raise in their minds interesting ideas.

CHAPTER V.

THE TEACHING OF ENGLISH: READING.

The General Work of the Senior School.

1. We have seen that when a child leaves the infant school his knowledge of the mother tongue should include a fund of simple stories which he remembers and can tell in childish language, and of pretty verse which he can repeat; some power of expressing his ideas intelligibly and connectedly; the beginnings of habits of clear and distinct utterance; and ability to read very simple and familiar language and to copy short sentences in writing.

The work of the upper school is to increase this knowledge and to develop this skill, and every fresh advance should grow out of the stage already reached. Throughout, the teacher should keep in view the aim of developing in his pupils the threefold power to enter into the expression of the thoughts of others, to feel the joy of appreciating beauty both in ideas and in expression, and to express their own thoughts and feelings clearly and appropriately both by word of mouth and by writing. In the senior school, however, the various branches of this instruction become more differentiated from each other, and it will be better, therefore, to discuss each branch by itself, though in actual school work each should, as far as is practicable, be made to bear upon each.

Reading to Pupils by Teacher.

2. The chief reason for teaching the mother tongue in school is, as has been said, that the ordinary restricted intercourse of the child with those around him does not supply him with a sufficiently copious stock either of ideas or of words. It is only from intercourse with others that this enrichment of the mental and moral life can take place, and, consequently, the school must enlarge the circle of intercourse, and the most important way of doing this is to introduce the child to books which interest him and so call forth and stimulate the desire to think and talk about the things they contain. And, obviously, the more restricted intellectually are the child's home surroundings the greater is the responsibility thrown on the school to attempt to widen the mental horizon and to evoke and stimulate intellectual tastes and desires.

It follows that to habituate its pupils to intercourse with books is one of the chief functions of the school. Such intercourse may be either indirect or direct. It is indirect when the pupils listen to a passage read to them by their teacher, and still more so when he tells them a story in his own words. Such telling and reading of stories have the same function and values in the lower classes of the senior school as they have in the infant school, and, for the reasons already given, reading should more and more preponderate over telling. It gives the children new ideas; it enlarges at once their thoughts and their speech; it prompts them to desire to master the art of reading more perfectly. Even in the upper classes reading to the pupils by the teacher has its place. It brings before them beautiful passages of literature outside the range of the books to which they have access, and when well done it makes them appreciate the music of words in a way their own private reading might not do. Throughout

the school course, then, the teacher should regularly read to his pupils passages of prose and verse selected on the grounds both of beauty of form and of nobility of idea.

The Essence of Reading.

3. But such indirect intercourse with books is only auxiliary to the direct intercourse through reading. This will not be made real and effective unless it is borne in mind that reading is essentially a mental act. It is the suggestion of ideas by visible symbols. Reading aloud is an addition to this process and by no means essential to it, just in the same way that the recognition of a cat or other object may be perfect without the utterance of its name. The confusion of these two quite distinct processes is one of the most common faults of the school. As the power of reading is usually tested in examinations by reading aloud, so the whole effort of the teacher is too often applied to securing this power. But it is matter of common experience that such 'reading' may be a mere mechanical series of utterances without any undercurrent of ideas. Some centuries ago boys were taught to 'read' Latin words aloud, that is, to utter certain sounds on the sight of certain combinations of letters without having any idea of what the words meant. Much reading aloud of English in schools is little better. The true proof that a child can read is, not that he can utter sounds in response to visible symbols, but that he can give an intelligent account of the matter he has read.

Reading Aloud.

Reading and elocution, then, are two different things, which may be, but are not necessarily, connected. And of these the former is the more important. The aim of the teacher of reading should be, then, to give the pupils the power to master books by themselves. To this, reading aloud should be auxiliary. In the lower classes, at any rate, the chief

object of practising children in reading aloud is to aid them in attaining the power to read to themselves. The child reads aloud in order that the teacher may know how the process is going on, and so assist in perfecting it. The essence of reading is that the visible symbols are recognised easily and accurately, and that they are grouped properly. When the child represents the printed symbols by equivalent spoken symbols the teacher can discover what mistakes he makes and what difficulties he encounters, and so help him to overcome them.

It is very doubtful whether hearing the words as well as seeing them is a help to the beginner in raising the ideas they represent. The child's tendency is to make only the association between visible symbol and spoken sound, and to omit the association between either or both of these and thought. So that the teacher has constantly to induce the children to talk about what they have read to ensure that their 'reading' is a real mental act. Until the initial difficulties of recognising printed symbols and grouping them are overcome there must be a good deal of reading aloud. But it should never exclude silent reading, and both should always be tested by requiring a reproduction of the matter read. Inability to give such a reproduction is a proof that there has been no real reading, no matter how fluent the mechanical utterance may have been.

Reading as Elocution.

4. When the mechanical difficulties of reading are overcome, reading aloud still holds its place as an exercise in elocution. Before this stage is reached all elocution exercises are of speech, such as the repetition of passages learnt by heart. It is true that the power of really fine elocution is no more universal than is the power of really fine singing. But some amount of elocutionary skill may be reached by all whose vocal organs are not fundamentally defective. All can be taught to

read aloud so as to convey the meaning of the author in a way not unpleasant to the hearer. And passages which are specially beautiful in form only impress the mind with their full force when they are heard. The pupils should, therefore, be encouraged and trained to read aloud poetry and rhetorical prose, even when they are reading privately for their own enjoyment.

Good renderings can obviously only be given of passages whose meaning has been mastered. We do not expect even an expert musician to express the soul of a work which he has not studied through and through. Yet children are too often called upon to read aloud with true feeling and expression passages they have never seen before. No doubt a good reader—that is, one really familiar with books—will do some justice to such a passage, just as the musician will in his rendering of an unseen piece. But the true test of the power of the one as of the other is not what he makes of the thing at sight, but what he can find in it and get out of it after careful study.

Elocution in reading is, then, a different thing with a different function from what is commonly known as 'reading aloud.' The latter indirectly aids the child in learning to read by making the teacher's help more available; the former is only possible when the child can already read, and read well relatively to the piece to be rendered. Yet elocutionary reading should be the outcome of reading aloud, and will be so if only the reading aloud is kept in continual touch with real reading, and is never allowed to ignore the connection of words with thoughts.

The highest qualities of elocution, indeed, will not be developed in the school. But intelligibility and pleasantness of delivery may be secured. These depend upon clear and distinct articulation, correct pronunciation,

fluent but not over rapid utterance as more mechanical qualities; and upon correct phrasing, emphasis, and modulation as more intellectual and emotional qualities. The former characteristics may be developed, and not infrequently are developed, in a mechanical manner, and the result is the soulless 'reading' with which we are all familiar. The latter can only come truly out of an appreciation of the spirit and meaning of the passage, and every attempt to produce them otherwise—as by direct imitation of the teacher's rendering—leads to an artificiality that is positively painful to the hearer and educationally deadening to the reader. It is obvious that the training of such habits of mechanical utterance is even worse than a waste of time: it is a misuse of it. As Professor Dowden says: "The reading which we should try to cultivate is intelligent reading, that is, it should express the meaning of each passage clearly; sympathetic reading, that is, it should convey the feeling delicately; musical reading, that is, it should move in accord with the melody and harmony of what is read, be it prose or verse."[1]

Principles of Method in Teaching Reading.

5. These, then, being our aims, we have to consider briefly how reading lessons may be conducted profitably. We lay down no hard and fast rules, for mechanical adherence to one set form of lesson is deadening in its monotony both to teacher and to taught. But a few general principles may be stated.

i. With Younger Children.

With children who have not yet mastered the art of reading, most of the time given to that subject will be spent in reading aloud. What is wanted is plenty of practice, and it is, therefore, obvious that the smaller the class the better. When the teacher has a large class it is well to take the children in

[1] *Essay on The Teaching of English Literature.*

small groups for oral reading, whilst the rest of the class does some form of work on paper or engages in silent reading. The attempt to increase the amount of practice by calling on a class to read simultaneously is not to be commended. Such exercises tend to monotony of utterance and expression; moreover, individual faults are effectually covered up, and so the child goes on forming bad habits of speech.

Vocal Drill.

The lesson may well begin with some vocal drill on one or two of the errors in utterance to which the children are most prone—of which the teacher should, of course, have made a list—selected in view of the actual difficulties likely to occur in this piece. The general mode of dealing with this is not different from that outlined in speaking of infant school work.[1]

Silent Reading.

After this drill the children should usually read a passage to themselves, if they have not already done so, to make out its general drift, and their success can be tested by one or two pointed questions. If they are unused to this exercise a question may be proposed to them before they read, so that in the reading their attention may be directed to finding the answer.

Reading Aloud.

When the general meaning has been found individual reading should follow. This the teacher should not interrupt by corrections, but he should note errors and deal with them at the end. To interrupt the reading is to take the children's attention off the meaning and concentrate it on the mere utterance.

Correcting Mistakes.

Of errors made there are two main kinds, those due to failure to understand the passage and those due to other causes, such as mere faults in pronunciation, or the kind of verbal slip that we all make at times and which makes no difference to the sense. The former can only be effectively dealt with by

[1] *See* pp. 109-11.

leading the child who made the error to see the true sense of the passage, which he should then be set to read again. Often this will develop into a general effort on the part of the class to find the true mode of expression.

Mistakes of pronunciation are met by telling the child the true pronunciation, or asking if any other child knows it. The latter plan has the advantage of showing the teacher whether it is desirable to give the whole class practice in saying that word, or whether only one pupil needs be cured. But to have the whole class on the pounce to find mistakes is bad in every way. It is true it may make the children 'attentive,' but it makes them attentive to the wrong thing—to the shortcomings of others instead of to the meaning of the passage read, and consequently inattentive to the meaning of what they are reading.

Mere slips, when quite unimportant and infrequent, may be ignored. When less unimportant the teacher may draw the attention of the reader to the mistake. But when slips become frequent on the part of any pupil they indicate the formation of a slipshod habit of mind which is not careful to seize the exact thought of the passage read. In this case the mistakes should be treated as faults of carelessness; the child should be reproved and the passage read again in his leisure time.

Cultivating Expression.

The teacher is aiming at having the passage understood, and at training the children to express by the voice what they understand. And no one who has heard children talk to each other can doubt that they have the power of expressing what they feel and think. The reason their reading is often so expressionless and wooden is because they do not feel or care for the matter, either because it is of the wrong kind, or because their attention is so fixed on connecting utterance with visible symbols that they never

think of it at all. The remedy for the former is obvious, and there is now-a-days no excuse for unsuitable books being used in school. The remedy for the latter is also obvious. Lead the children by conversation to enter into the piece and they can express it well enough.

In no case is the true remedy for the teacher to give a pattern-reading of the piece and then call upon the child—or even the class simultaneously—to imitate that rendering. This practice has done much to produce the dreary artificial oral 'reading' of which we find so many examples in schools. That the teacher should read regularly to the children has been already insisted upon, and this should set a model of good reading before them. But the influence of that model will be general, not a special and mechanical copying.

The teacher's work, then, is to help the children first to understand and feel what they are reading, and then to overcome the physical and mechanical difficulties of vocal expression. This requires insight and tact. For while the teacher should be on his guard against doing too much for his pupils, he must yet bear in mind that his share is important though unobtrusive. He must remember that merely to hear reading is not to teach reading.

ii. With Elder Classes.

As the pupils master the art of reading more perfectly, a larger proportion of their reading should be silent, and, as was pointed out in an earlier chapter, much of the learning which is now done through oral lessons should be done by means of reading.[1] The number of oral reading lessons will, therefore, gradually decrease, though the total amount of time given to reading should increase.

As the habit of clear and distinct utterance becomes more firmly fixed the oral reading lessons will deal more and more with matters of expression, less and less with

[1] *See* pp. 82-3.

matters of articulation. But it must be borne in mind that good expressive reading is impossible unless the mechanical qualities of clear and distinct utterance have been secured. It is only when these have become automatic that the mind can use them as facile instruments in the expression of thought and feeling. Hence, the need for drill in the mechanical factors of elocution will not cease, though it becomes less and less in amount.

Phrasing.

The most essential point to secure is correct phrasing. No mechanical rules, such as determining pauses by punctuation marks should be given. The true function of punctuation marks is to make the construction clearer, and attention should be fixed not on them but on the meaning. Every separate 'picture element' or 'idea element' presented by the passage should be marked by a pause whether there are stops or not, and that pause should be of greater or less duration according to the degree of closeness of connection between the elements. As, for example,

> "On one side | lay the Ocean, ‖ and on one |
> Lay a great water, ‖ and the moon | was full."

where a pause should be made at each vertical line. Thus, correct phrasing is the expression of a clear understanding of the elements which together compose the whole which the mind of the hearer has to construct.

Emphasis.

Next to phrasing comes emphasis, and this evidently depends on apprehension of meaning. By varying the emphasis the meaning can be varied. For example, "And he said to his sons, 'Saddle me the ass,' and they saddled him;" if read with the emphasis on the last word suggests a meaning quite different from that given when the stress is laid on "saddled."

In addition to stress on particular words, emphasis is given to phrases or clauses by variation in the rate of reading. A passage read more slowly than the rest and with stress on each word stands out most prominently, even though it be read softly. Such emphasis is the outcome not only of intellectual grasp of meaning, but of a feeling of the relative values of the various constituent parts of the whole passage.

Modulation.

Modulation of voice is positively offensive when it is not the natural expression of the felt meaning and force of the passage. It is essentially a largely unconscious variation of pitch due to the emotional influence of the ideas expressed. Thus, passages vary enormously in the amount and kind of modulation appropriate to them. A mere statement of bald fact, such as 'London is the largest city in the world,' requires scarcely any modulation. Such statements of fact should be read, as an intelligent person would state them, in a plain, matter of fact way. But when the passage expresses some strong emotion, as

> "Ah, miserable and unkind, untrue,
> Unknightly, traitor-hearted! Woe is me!
> Authority forgets a dying king,
> Laid widow'd of the power in his eye
> That bow'd the will. I see thee what thou art,
> For thou, the latest-left of all my knights
> In whom should meet the offices of all,
> Thou wouldst betray me for the precious hilt;
> Either from lust of gold, or like a girl
> Valuing the giddy pleasure of the eyes."

its effective rendering requires much both of emphasis and of modulation. But the only true source of such effective rendering is that the reader enters into the emotion expressed, identifies himself with it, and so gives utterance to it as the expression of his own life. To

help him in every way possible to do this is the teacher's function.

Closely allied with modulation is difference in quality of tone which gives to poetry or prose its musical character. This is due to the values given to the constituent parts of the words—the length, openness, and sonority of the vowels, and the greater or less force of the consonants.

Thus, whichever way we look at it, we see that good reading aloud has its root in an established relation between the mind of the reader and that of the writer of the passage read. This relation acts on a certain mechanism of musical voice production, and renders it intelligent, sympathetic, and in harmony with the thought and feeling of the passage.

Reading of Poetry.

These qualities are necessary to all effective reading aloud. But when the reading attempts to render poetry it requires yet other excellencies, or rather special forms of the excellencies already considered. For the distinction between poetry and prose is a very real one, and to obscure it in the rendering is to fail in the first requisite of good reading. In an article on *Rhythm and Rhyme,* Mr. G. Bourne admirably brings out the special points to which the reader of poetry should have regard. We will venture to give them in his own words:

"It is the function—it is the characteristic feature—of verse, to utilise in words a quality of resonance which they all have; a vibrant force of sound scarce audible in them singly, but of wonderful power when they are made to pulsate together. In prose words are at best but muted strings; in poetry they ring out full-toned, and the reader's spirit is made more sensitive to each word's meaning. As the production of this tone is the making of poetry, so the hearing of it is what constitutes the reading of poetry. . . .

It is always true that there is no poetry for those who do not hear the sound of lines; and in order to hear lines, it is necessary to value the sound, and especially the duration of the sound of single syllables. . . . The cessation of a poet's line is almost as important as the progress of it. It comes in its due place by a natural law, which is no wanton convention, but which it is wantonness to ignore. And the same holds good with stanzas also; the strong beat set up by the grouping demands an equally marked cessation of sound at the appointed moment. One would say that the poet must create a silence in which he can be heard; but what is most strange is that the silence itself may become a valuable aid to the poet in emphasising his meaning. Of course, not every poem uses this effect. . . . The point is that poetry may do this thing with a certainty most enviable by the prose writer, who can but dot in his pitiful row of asterisks and hope that the reader will check at them."[1]

In addition to the marking of the rhythmic structure of verse by phrasing and modulation and stress, the function of rhyme must not be neglected. "The clock ticks regularly through its hour and then strikes; the poem tells out its even syllables, and their periods are chimed out in rhymes. First and last that is rhyme's chief function, to emphasise and regulate the rhythmical time. . . . But the great masters of words often adapt it to a further use. The two rhymed words in a stanza are above all the others conspicuous. If therefore the poet can also concentrate his meaning upon those same words, the light of it will be diffused the farther, the rhymes being then like beacon-fires answering one another across the whole verse."[2] Alliteration must also be manifested when it

[1] *Macmillan's Magazine*, May 1906, pp. 541-5.

[2] *Ibid.*, p. 547.

is present by emphasis in the reading. "When the poet leads off the weightier syllables of his verse all with the same letter, it causes each to ring as with a hammer-stroke; and while we like the repeating letter, we like still more its effect on the syllables, of marking their equal importance and increasing the volume of their sound. It is their statelier rhythm that most truly affects us."[1]

In short, poetry can only be effectively read aloud by one who feels not the meaning only but the form, who understands the structure of that form and whose soul vibrates to its music and through it feels the thought to be nobler, more dignified or more graceful. In poetry, indeed, thought and form of expression are indissolubly united, and neither can be fully appreciated apart from the other. That is why we never feel to the full the spirit of poetry unless we either read it aloud ourselves or hear another read it.

Amount of Practice.

It is evident that each pupil must read a considerable passage at once if the art of effective oral reading is to be acquired. When each pupil reads only a sentence or two, except in dramatic writings where each takes one character, there is little opportunity for him to express the emotional value of the passage, which is, indeed, lost by being torn into fragments. It is more valuable for a pupil to read a considerable passage once or twice a week than to read two or three sentences daily. The advisability of frequent oral reading in small groups remains, though in a less pressing form than in the lower classes.

The common custom of giving each pupil in a class a book containing what is being read, and requiring him to follow it, is necessary whilst the art of reading is being

[1] *Macmillan's Magazine*, May 1906, p. 549.

acquired. But as proficiency is attained this should gradually be discontinued, and each reader should be expected to make himself intelligible to a class which merely listens to him. Not only does this cultivate clearness and distinctness in the readers, but it trains the other pupils in continuity of attention, and directs that attention to the right point, that is, to the meaning. Another advantage is the much greater variety of reading that can be secured, as only one copy of the book read is required. If, further, pupils are encouraged to prepare at home pieces they like and bring them to school to read to their fellows, interest in reading is markedly cultivated. Of course, the teacher's approval of every such piece should be obtained beforehand.

Reading to Hearers without Books.

In this way, the reading lessons are made really effective and valuable. It can be pertinently urged against the reading lesson as commonly conducted that it positively hinders that continuity of attention which it should be one of the chief aims of school work to develop. Such a charge cannot be brought against the method here outlined. But even so, reading aloud in the upper classes should be chiefly exercised on matter which appeals more strongly to the emotions and to the sense of rhythm, harmony, and beauty than to the intelligence or to the memory. Of course, for the reasons already given, poetry should always be read aloud. Silent reading, in which each pupil can go at his own rate, can return on himself, can compare passage with passage, can pause to reflect or to make sure he has grasped the meaning, can refer to dictionaries and other books to clear up difficulties, is the appropriate means of bringing his mind into relation with statements of fact and trains of reasoning. The general lines on which

Matter suited for Reading Aloud.

children may be trained to learn effectively from books have been already indicated.[1]

Reading Books. 6. The best methods of conducting reading lessons, however, must fail in their true object of leading the young to enjoy good literature unless the school reading books are wisely selected. Till quite recent years this was a matter of supreme difficulty, but now the teacher has a choice of quite a large number of really good reading books, though the number of bad ones is probably yet greater. The qualities to be demanded in a school reading book are that it should be capable of exciting the pupils' interest, that it should enlarge and ennoble their ideas, that it should be well written, that its vocabulary should be in relation to that used by its readers, though more extensive, and that its style should be simple but not artificially childish. It should be well and clearly printed on good paper, and if there are any illustrations they should be artistic and well executed.

It cannot be doubted that school reading books now-a-days are often much too copiously illustrated. An illustration should supplement, not supplant, the imagination and fancy of the children. For instance, pictures showing how Romans and Tuscans were armed, and perhaps even the kind of bridge which Horatius and his companions defended, would help pupils to picture the incidents in Macaulay's lay *Horatius*. But pictures of the various episodes described in that lay are quite undesirable, for they hinder the attempts of the children to picture the scenes vividly for themselves; indeed, they often prevent such attempts from being made. Pictorial illustrations which promote mental activity are good; those which make it needless are educationally bad, whatever artistic merit they may display.

[1] *See* pp. 83-4.

Reading books should contain passages of good verse dealing with topics which interest children of the age for which the books are intended, and expressing towards those topics attitudes of mind into which the children can enter, and which it is good for them to experience. Poetry, however simple in expression, which appeals to complex emotions and to subjective introspection is quite out of place in a child's reading book. A healthy external outlook on life and nature is the spirit we should try to cultivate.

If the term 'reading book' be confined to those books which are used mainly for oral reading, then we see that the contents should be of value as literature rather than as information. The attempt to combine the two, like most endeavours to kill two birds with one stone, usually hinders the attainment of the result which should be sought from each. The chief exception is the history reader, which, if well chosen, is at once literature and the medium of conveying definite information.

The book read primarily for the instruction it conveys should, as a rule, be read silently for the information it contains; oral reading should stir feeling and emotion, stimulate taste, and inspire ideals; any addition to knowledge it makes is incidental and unessential. Thus, in the books for the younger children, fairy tales and other forms of folk lore have their place; for those of older growth stories, both from history and from fiction, should form the staple; whilst for the oldest classes of all the finer types of literature, such as essays from Bacon, Steele, and Addison, and descriptive passages from Ruskin, should find a place. Indeed, in the reading books for the highest classes examples should be found culled from all the great literatures of the world, so that the pupils may to some extent appreciate the extent and variety of the

world's spiritual treasures. As Professor Dowden says, "To know that there is a literature of the world, and to have felt, even for a moment, something of its seriousness, its beauty, its generous passion, its pathos, its humour, is to lay a good foundation."[1]

The school reading book will, then, be a book of well chosen extracts in prose and verse, each of real literary merit, and each likely to awaken an echo in the hearts of some at least of the children for whose use it is intended. But by the side of such a book is the need for a more continuous reader, in order to train in the pupils the power and habit of continuity of interest. This reader may be an edition of some standard novel or some long poem, either complete or abridged.

To reading a complete novel orally in class there are the objections that the progress is so slow that interest flags, and that many of the pupils read the latter parts of the book to themselves before those parts are reached in the class reading, and that this destroys the interest for them. The latter objection has little force, for most children read their favourite books over and over again. But the former is really serious. This objection may be met either by having much of the novel read silently and quickly and only the more dramatic scenes or beautiful passages read orally in class, or by using a set of extracts from it, which if well selected are likely to send many of the pupils to the school or town library to borrow the book. Another plan is to have a reading book of long extracts from various books, each of which leaves off at a stimulating point, to let the children note down the author's name and the title of the book from which each extract is taken, and to encourage them to borrow these books

[1] Introduction to *The Temple Reader*, p. xvi.

from any available library and read them. Each of these plans has been successful, though it is obvious that the success of the last two depends on the accessibility of a library.[1]

School and Class Libraries.

This leads us to insist that school and class libraries should be regarded as essential parts of a well fitted school. We do not merely mean collections of books which can be lent to the pupils to read at home, though they, too, are needful, but books that children can use in school, sometimes reading under the teacher's general direction, at others allowed to browse at will on those pastures which most attract them. Time for this could be found if only teachers and others who direct the educational occupations of children were less enamoured of "that asinine feast of sowthistles and brambles which is commonly set before them, as all the food and entertainment of their tenderest and most docible age."[2]

[1] Attention may be drawn to the excellent and cheap series of short but complete classics published by Messrs. Blackie and Son under the general title *English School Texts*. These form admirable reading books for the upper classes.

[2] Milton, *Tractate on Education*.

CHAPTER VI.

THE TEACHING OF ENGLISH: LITERATURE.

Learning by Heart and Recitation.

1. By means of well selected reading books, the use of a well stocked library, and the encouragement of pupils to bring other books to school to read for the benefit of their class-mates, a considerable amount of literary ground can be covered, and a hope may reasonably be entertained that each pupil will have found something to appeal to him and to develop in him a liking for things and thoughts outside "the trivial round, the common task" of his everyday life. But in the cultivation of literary taste it is as needful to add intensive to extensive study as it is in the case of a training in music.

Choice of Passages.

With the younger classes this intensive study will be confined to the learning by heart and recitation of passages of poetry or prose, and throughout the school course this should be a regular exercise. Each passage should be complete in itself, and should appeal in its sentiment and general tone to the children's hearts. If that is secured it is little drawback if it contains expressions and allusions of which the

children have only an imperfect intellectual grasp. After all, comprehension and appreciation are relative terms. No two minds see exactly the same beauties in any work of art or piece of nature, and no two minds have exactly the same grasp of the thought expressed by another. A child can only appreciate to the fullest extent of his powers. He may feel his heart stirred within him by ideas and thoughts of which his comprehension is less than is that of his teacher. Indeed, it may be held that much of the literature taught in school should be somewhat in advance of the present capacity of the children, so that it may not soon be 'put away' with other 'childish things.' A really fine piece of poetry, no matter how simple its expression, enshrines in a beautiful setting a gem of noble thought which will flash in ever new colours and fresh tints as time mellows the light of our experience.

The qualities which poetry worthy to be learnt by heart should possess were admirably summed up by Matthew Arnold in one of his School Reports: "That the poetry chosen should have real beauties of expression and feeling, that those beauties should be such as the children's hearts and minds can lay hold of, and that a distinct point or centre of beauty and interest should occur within the limits of the passage learnt—all these are conditions to be insisted upon."

Of course, passages learnt by heart will generally be poetry, but the committing to memory of short and striking passages of prose should not be debarred, and will be more frequent as the pupils advance in age.

Method of Learning.

When the teacher has decided that a passage is worthy of being committed to memory his efforts must be directed towards arousing in his pupils' minds the desire to learn it by heart. Nothing is less calculated to do this than the common

practice of calling upon a whole class to repeat the passage simultaneously, line by line, after the teacher. Indeed, such a dreary, monotonous, mechanical, tread-mill method of proceeding may be relied on to smother most effectually any real love for poetry and any desire to commit it to memory.

In no case is it more absolutely essential to evoke desire than in this, for the teacher's object should not be to secure that every child in a class has memorised a certain number of lines, but that every one of his pupils, to the fullest extent of his capacity, has had his heart touched by noble thought and sweet sound, and has found delight in making his own that which has so wrought upon him. So is he forming a habit of committing to his memory passages which impress him by their beauty or their truth. If this is not secured, if learning poetry by heart is looked upon as a task to be discontinued as soon as school life is over and not as a natural reaction of the mind to pieces of literature which specially attract it, then no matter how perfect the class recitation may be from the point of view of a mechanical examination, the learning of that which is recited has been educationally mischievous.

Further, children are drawn towards poetry in different ways and to different extents. A passage which evokes enthusiasm in one will leave another cold. They differ, again, in the ease with which passages become fixed in their memories, so that what is easy for one is difficult for another.

All these considerations point to the conclusion that the pupils should be encouraged to learn by heart passages they delight in, but that they should not be compelled to do so. There is no educational reason, indeed there is no reason save custom and that love of mechanical uniformity

which works such havoc in educational work, why all the members of a class should be expected to commit to memory exactly the same passages. Whenever that is insisted upon, with some children at any rate the learning becomes a matter of the teacher's compulsion, and the true object of the exercise is made nearly impossible of attainment. When the teacher really loves poetry, and the class reading book contains suitable pieces which the teacher reads to his class and talks over with them, leading them to penetrate the meaning and feel the spirit of the whole, it is easy to excite in many breasts the desire to finish the learning, which, indeed, is nearly done by the time the discussion of the passage is finished. This completion of the memorising will be most conveniently accomplished out of school.

The teacher can aid the actual learning by showing how the consecutive stanzas or other divisions may be most readily linked together by associating them serially both by sequence of idea and by flow of words. All that is needed further is for the teacher to show his appreciation of his pupils' efforts.

So in a recitation lesson the dreary and deadening monotony of the same passage being said over and over again, simultaneously and individually, and by all in the same artificial mechanical way, which is the inevitable outcome of simultaneous repetition in imitation of the teacher's line to line copy, will be replaced by the individual saying of many pieces, each of which, having been learnt with hearty willingness and because it is liked and felt, is recited with true and natural expression. For, as Ruskin says, "Fine elocution means first an exquisitely close attention to, and intelligence of, the meaning of words, and perfect sympathy with what feeling they describe; but indicated always with reserve."[1]

[1] *Fors Clavigera*, vol. iv., p. 469.

Intensive Study of Content and Form of Literature.

2. In the upper classes, though it is to be hoped and expected that the actual amount learned by heart will continually increase as the pupils' knowledge and appreciation of literature grow, yet it should no longer be the only addition to the use of the reading book. In these classes a more detailed study should be undertaken of both the content and the form of literature. This should grow gradually out of the discussions of passages of which we have just spoken. From general understanding of thought and a more or less vague feeling of appreciation, the children should be led to a more explicit comprehension of why such and such a passage is effective, and of the full extent and force of its meaning.

The utmost tact is necessary to prevent such detailed examination of matter and form from destroying the effect of the passage on the mind. As the beauty of a flower disappears when it is dissected, so that the teacher of natural history must always be on his guard lest in giving information he destroys "admiration, hope, and love," so it is with the flowers of literature. Indeed, so great is the danger that a teacher who does not feel intensely the sacredness of the beauty of literature will be wise not to attempt to give such lessons as those we are about to consider. Better is it to leave the young mind to the vague and unconscious influence of what it reads than to form the habit of approaching every literary masterpiece in a coldly critical spirit. Any analysis of literary form, any working out of allusions, similes, and metaphors, any marking of the appropriateness of words and rhythm to idea, or bringing out the effect of rhyme and alliteration, which is not kept strictly ancillary to the effect of the passage as a whole does more harm than good. But when kept subordinate

and carried out with care and reverence it is of considerable value.

By good reading aloud the teacher should have given his pupils, even in the youngest classes, a feeling for the beauty of rhythm, rhyme, and alliteration, though it will be largely unconscious. In the older classes this should be made explicit. Probably this is most effectively done by so changing words as to destroy the element of form, and then comparing the effect of the mutilated passage with the original when both are read aloud. For example, nothing appears to the child when he first thinks about it as more artificial than rhyme, or less essential to the expression of meaning. Take, then, as Mr. Bourne suggests, such a passage as Campbell's—

> "On Linden, when the sun was low,
> All bloodless lay the untrodden snow,
> And dark as winter was the flow
> Of Iser, rolling rapidly."

"And, to whatever it be due, it is impossible to deny a great dignity in the verses. They have a charm to penetrate deaf ears. And what part in this do the rhymes play? It is worth while to try. Preserving the metre of the verses unimpaired, we may get rid of the rhymes by a slight alteration. We will let the first line run 'On Linden, as the sun went down'; and in the third we will say *flood* or *stream* instead of *flow*; and—well, is the change important? We have only robbed the thing of its penetrating force, converted its stately march into a jog-trot amble not worthy of attention and not likely to attract any. In short, we have done no more than spoil the poem. Its golden circlet of rhyme seems to have been a royal crown, torn away by our democratic common-sense."[1]

[1] Article on Rhythm and Rhyme, *Macmillan's Magazine*, May 1906, p. 546.

Of course, such an exercise will not need repetition. When once the fact that much of the force of verse depends upon such an element of form as rhyme has been brought home to the mind, there is no need to prove it again, though it may be referred to frequently. But in some such way it is desirable to help the children to feel that every word and every syllable in a perfect poem is necessary to its perfection, and exercises which do this and go no further are always admissible, and sometimes absolutely necessary if any worthy appreciation of beautiful form is to be trained. But the mind should not be allowed to dwell on the mutilated passage; it should turn from it to the noble original with relief and renewed enjoyment. If this is not secured such an exercise may actually have the vicious result of inciting the pupils to deform and debase other verse merely as an exercise in ingenuity.

The true object of the detailed consideration of a piece of literature is to get from it as much as possible of what the author meant to put into it. "Passive reading," says Lord Avebury, "is of very little use. We must try to realise what we read."[1] The teacher's function is to help each individual pupil to such realisation. Of the kind of help a good teacher may give Ruskin gives us an example in sections 20-26 of his *Sesame and Lilies*, a passage which every teacher of literature will do well to study, though the portion of *Lycidas* dealt with is more suited to older pupils than it is to those in primary schools.

Example from Tennyson's 'Idylls of the King.'

3. Let us take, as a simpler example, the passage from Tennyson's *Idylls of the King* in which the poet describes the throwing away of the sword Excalibur by Sir Bedivere, beginning

"So all day long the noise of battle roll'd,"

[1] *The Use of Life*, ch. ix.

and continuing for a hundred and sixty lines to

> "But when I looked again, behold an arm,
> Clothed in white samite, mystic, wonderful,
> That caught him by the hilt, and brandished him
> Three times, and drew him under in the mere."

This supplies material for several lessons. The general order of treatment would involve three readings of the poem.

In the first the general drift and meaning of the passage are considered, and the aim is to raise enthusiasm and interest in it as a beautifully told story, and to set up an ideal of duty triumphing over temptation.

In the second reading consideration is given to the form, though not to the form alone, but always in relation to the matter. The aim here is to make clear every expression and to lead to an appreciation of such things as the exquisite choice of words, the harmony of sound and rhythm with idea, and the beauty and appropriateness of simile, metaphor, and descriptive epithet.

The third reading gathers up the results of the two former, and should result in a fuller and deeper appreciation, intellectual, emotional, and aesthetic, of the whole passage which would find its natural expression in an intelligent and sympathetic oral reading by the pupils.

General Apprehension of Whole.

The first reading must be set in a background of the main outlines of the Arthurian legend. Few better subjects for detailed study by pupils of about thirteen years of age could be chosen than a selection from the *Idylls*, making a consecutive and organic whole, and if this has been taken the passage now under consideration falls into its natural place, and the only introduction required is for the teacher to remind the children

(*a*) of the oath of obedience and fealty to the king taken by the knights of the Round Table; how

> "Arthur sat
> Crowned on the daïs, and his warriors cried,
> 'Be thou the king, and we will work thy will
> Who love thee.' Then the king in low deep tones,
> And simple words of great authority,
> Bound them by so strait vows to his own self,
> That when they rose, knighted from kneeling, some
> Were pale as at the passing of a ghost,
> Some flushed, and others dazed, as one who wakes
> Half-blinded at the coming of a light."[1]

What, then, was the nature of this awe-inspiring oath? Arthur tells us—

> "I made them lay their hands in mine and swear
> To reverence the King, as if he were
> Their conscience, and their conscience as their King,
> To break the heathen and uphold the Christ,
> To ride abroad, redressing human wrongs,
> To speak no slander, no, nor listen to it,
> To lead sweet lives in purest chastity,
> To love one maiden only, cleave to her,
> And worship her by years of noble deeds,
> Until they won her."[2]

The teacher should emphasise markedly the second and third lines, as they bear directly on the conduct of Sir Bedivere soon to be described.

(*b*) of

> "Bedivere, the first of all his knights,
> Knighted by Arthur at his crowning."[3]

(*c*) of the history and properties of Excalibur, especially of the two inscriptions on the blade—

> "on one side,
> Graven in the oldest tongue of all this world,
> 'Take me,' but turn the blade and you shall see,

---

[1] *The Coming of Arthur.* [2] *Guinevere.* [3] *The Coming of Arthur.*

And written in the speech ye speak yourself
'Cast me away!'"[1]

(*d*) of the battle with Modred, the disastrous issue of which leads immediately to the passage now to be studied—

"Then Modred smote his liege
Hard on that helm which many a heathen sword
Had beaten thin; while Arthur at one blow,
Striking the last stroke with Excalibur,
Slew him, and all but slain himself, he fell."[2]

If there has been no previous study of the *Idylls* the teacher must give an oral lesson setting forth the main outlines of the legend, taking care to bring out strongly the four points with which we have just dealt.

After this introduction the first reading commences. The passage naturally divides into three sections, and the general method of dealing with each should be for the teacher to induce by conversation with the pupils such a setting of ideas as will make his reading of the section successful in its appeal to their minds and hearts. In such a conversation phrases and brief passages of the poem itself which might prevent the apprehension of the meaning of the whole may, at times, be introduced in such a way as to make their general signification clear. The result of the conversation should be that the pupils are in a state of expectancy and anticipation which demands the reading of the passage for its satisfaction. Each section is, therefore, completed by an uninterrupted reading by the teacher, the pupils having no copies of the poem, but concentrating their efforts in imagining the scenes and feeling the emotions expressed by the words they hear.

[1] *The Coming of Arthur.* [2] *The Passing of Arthur.*

The first section begins by picturing the scene, and the children may be allowed if they will to close their eyes so as to give their visual imagination free play, uninterrupted by the sights around them. Let them see vividly the lonely spot, the "broken chancel with a broken cross" to which Sir Bedivere, the last, as he had been the first, of Arthur's knights, bears the dying king. Let them then try to imagine the thoughts and emotions that would pass through Arthur's mind as he reflected on his life's work and its sad outcome, and to think what last thing he would feel there remained for him to do. Here the teacher may quote the half-dozen lines in which the king recalls how he first obtained possession of the sword. But how can Arthur cast the sword into the lake now he is wounded? So the mission of Sir Bedivere is seen to be natural and inevitable.

Let the children now dwell a little on the beauty and richness of Excalibur, so that they may understand the temptations which might assail the knight. Let them try to put themselves in his place—to see him just about to throw the sword, when the flash of moonlight glinting on the jewelled hilt brings sudden temptation upon him. Unless they feel deeply the force of the temptation the lesson will here lose its grip on them. If they do feel it they will suggest the result, which the teacher will do well to give in Tennyson's words. The teacher then, with the aid of the class, sums up the heads of the story so far, and closes the section by an uninterrupted reading of the passage.

The second section then follows with the query: What then would be the feelings of Bedivere? and of Arthur? Alternately the pupils must put themselves in the place of each, feel shame with the former, and grief and disappointment with the latter. This last feeling is led up to by a fuller examination of the reason why Bedivere had been

so wrong in yielding to the temptation, and how the king would, in consequence, regard his conduct. The teacher should then read as impressively as he can the second charge—

> "Yet now, I charge thee, quickly go again,
> As thou art lief and dear, and do the thing
> I bade thee, watch, and lightly bring me word."

The children must go in heart and thought with Sir Bedivere as he slowly seeks the lake the second time. If they have entered sympathetically into his state of mind they will, with a little assistance and suggestion from the teacher, work out the train of thought by which he tries to deceive his conscience. But that he has not really done so, though he has hardened his heart, will be brought out by quoting—

> "And so strode back slow to the wounded king."

Here the second section ends, and all that is required is an impressive reading by the teacher.

In the third section the children must again be asked to put themselves in the place of the king, who knows his end is near while his last task yet remains unaccomplished. They must feel the sore indignation which provokes his bitter reproaches. Then they must in turn feel the effect of the stinging words on the loving but erring knight, so that they are stung with him, with him plunge blindly down to the lake, seize the sword, and, with eyes closed to temptation, fling it whirling into the mere. Here they will picture the great sword's flight through the moonbeams, and then foretell the end. The teacher now reads the account of what they foresaw would happen. Teacher and class together briefly discuss Sir Bedivere's state of mind, and the reasons for his joy and satisfaction. Together they go with him as he "lightly" seeks

his master, contrasting this third return with the two previous ones. Together they anticipate the character of the conversation between the dying king and the faithful knight. The teacher's reading completes the section.

No attempt should be made at any explicit statement of the moral lesson to be learnt. This lesson is obvious, and will be more effective if it is not talked about or formulated. There are few greater mistakes than to attempt to state a direct moral outcome of a piece of literature. As Addison says, "As exercise becomes tedious and painful, when we make use of it only as the means of health, so reading is apt to grow uneasy and burdensome, when we apply ourselves to it only for our improvement in virtue. For this reason, the virtue which we gather from a fable, or an allegory, is like the health we get by hunting; as we are engaged in an agreeable pursuit that draws us on with pleasure, and makes us insensible of the fatigues that accompany it."[1] When the literature has been truly treated, its lesson for life, whatever it may be, whether 'moral' in the narrower sense or not, will have been learnt by each pupil to the full extent to which he is capable of learning it, and in the way most likely to make the learning real. It is in the intensity with which the pupils enter into and realise the moral situation and respond to it emotionally and volitionally as well as intellectually that the training effect of the teaching of literature centres.

Detailed Study. In the second reading of the poem each pupil will have a copy of the words and a manuscript book, in which he can enter such short notes as he needs. As has been said, much delicate tact is necessary to prevent the detailed examination of form in relation to matter from marring, instead of enhancing,

[1] *The Tatler*, No. 147.

the effect of the previous lessons. The teacher must feel his way carefully with his finger on the emotional pulse of his class. After all, the result depends on him. If his heart is really attuned to the poem, if his eye is continually on it as an exquisite whole so that all his efforts are directed to bringing out its various beauties as elements in that whole, if his literary enthusiasm never flags, there is no danger. It is evident, then, that no rule can be laid down as to the extent to which the consideration of detail may be profitably carried; it depends on the teacher much more than on the class, though, certainly, all children are not equally responsive to beauty of literary form. We shall, therefore, only indicate and exemplify the kinds of points to which attention may profitably be directed.

First, there is fuller elucidation of the meaning of words and phrases, such as—

"The sequel of to-day unsolders all
The goodliest fellowship of famous knights
Whereof this world holds record."

"Clothed in white samite, mystic, wonderful."

"Myriads of topaz-lights, and jacinth-work
Of subtlest jewelry."

"as beseemed
Thy fealty."

"As thou art lief and dear."

"How curiously and strangely chased."

"a dying king
Laid widowed of the power in his eye
That bowed the will."

This is, of course, merely auxiliary. The teacher's full aim is to make the pupils realise that in poetry the verbal expression fits the meaning and gives it an enhanced beauty and force.

Lead the children to appreciate the skill with which the poet calls up vivid pictures in the mind, as in the passage—

> "And in the moon athwart the place of tombs,
> Where lay the mighty bones of ancient men,
> Old knights, and over them the sea-wind sang
> Shrill, chill, with flakes of foam."

or in

> "the shining levels of the lake."

or again

> "in the many-knotted waterflags,
> That whistle stiff and dry about the marge."

Let them realise how we seem to hear

> "the ripple washing in the reeds,
> And the wild water lapping on the crag."

It is quite useless to *tell* them these things: they must be led, by effective reading, by giving them time to dwell on the words, by contagion of the teacher's enthusiasm, to realise them for themselves.

Bring home to the children the force of such descriptive words and phrases as "clothed in white samite, *mystic, wonderful*," "dividing the swift mind," "clouded with his own conceit," "the *giddy* pleasure of the eyes," "the *splendour* of the moon." Make sure that the similes and metaphors are appreciated in—

> "The great brand
> Made lightnings in the splendour of the moon,
> And flashing round and round, and whirled in an arch,
> Shot like a streamer of the northern morn,
> Seen where the moving isles of winter shock
> By night, with noises of the northern sea.
> So flashed and fell the brand Excalibur."

Most important of all, in cultivating the sense of literary form, is to bring home to the children how the characteristic sounds in a passage are in accord with its main idea. Thus, the opening sentences, with their long and

open vowels, and soft and smooth consonants, give the feeling of mournfulness. Then the change to the harsher initial consonants at

> "The bold Sir Bedivere uplifted him,"

gives the feeling of effort and strain. Arthur's soliloquy is appropriately set to words with continually recurrent, long, but close vowels with soft consonants, again changing to more stirring consonant sounds at

> "Thou, therefore, take my brand Excalibur,
> Which was my pride,"

and subsiding again to the preceding note at

> "for thou rememberest how."

The energy again breaks out at

> "But now delay not: take Excalibur,
> And fling him far into the middle mere."

The reply of Sir Bedivere is couched in short and almost jerky syllables, and hearing the words

> "He, stepping down
> By zig-zag paths, and juts of pointed rock,"

compels the imagination to represent the rough clambering down the rugged path, whilst the very next line,

> "Came on the shining levels of the lake,"

gives in the sounds of the last five words the spirit of quiet waters in the still moonlight.

Enough has probably been said to make clear the spirit in which this harmony between sound and sense may be brought home to the children. But we cannot refrain from pointing out how much of the picture-forming power of

> "the ripple washing in the reeds,
> And the wild water lapping on the crag,"

is due to the very sound of the words, or how the rush and energy of swift movement start out of

> "and ran,
> And, leaping down the ridges lightly, plunged
> Among the bulrush-beds, and clutched the sword,
> And strongly wheeled and threw it,"

with its hard consonants and short vowels, to which the full force should be given in oral reading—by teacher or pupils as may be thought advisable. The more vividly the children appreciate the importance of almost every letter in rendering meaning effectively, the more will they strive to attain distinctness and force of utterance. And the teacher who realises this will see how important it is to cultivate this art in his pupils as an aid to their culture.

When by tasteful reading it has been brought home to the pupils that the force of ideas is expressed by the very sound of well chosen words, they will delight in finding new examples for themselves. But the teacher must be on his guard lest the interest in the words as mere words becomes dominant instead of that in the union of words and thought.

Of course, these various aspects of literary form will be considered together as they occur in the poem, not one at a time as, for simplicity of exposition, they have been treated here.

After this intensive study of form a little time may be spent on a consideration of the character of Sir Bedivere as shown in the passage, on which the pupils might well write a short essay, illustrating their judgments by lines from the poem, which they should have by their side for reference.

Third Reading.

The class is now ready for the third reading, which will be an oral rendering of the whole piece, various pupils taking the different portions, but care being exercised that each such portion gives one

complete step in the story. The teacher who has succeeded in his aim will find that much of the poem is already known by many of the pupils, and that they will be keenly interested in completing the learning of it, which he will encourage them to do.

Passages of a predominantly Intellectual Character.

4. Of course, in much literature the appeal is much more predominantly to the intellect than it is in the poem we have just studied. In such cases, though the general mode of treatment will be the same, the emphasis will be differently placed. For in such writings it is not so much the inner feelings and motives which find expression as the current of thoughts. The teacher's primary aim must, therefore, be to ensure that those thoughts are re-thought by his pupils, and this involves such a study of the form of expression as will make plain its excellencies. For example, to take the opening of Bacon's essay on *Riches*—

Examples from Bacon on 'Riches.'

> "I cannot call riches better than the baggage of virtue; the Roman word is better, 'impedimenta'; for as the baggage is to an army, so is riches to virtue; it cannot be spared nor left behind, but it hindereth the march; yea, and the care of it sometimes loseth or disturbeth the victory."

Here the success of the pupils in mastering Bacon's meaning is altogether dependent on the fulness and vividness with which they enter into his metaphor. What is the baggage of an army? Why is the Latin word here more expressive? What is the object of an army's march? Why is baggage necessary to it? Yet how may the baggage hinder it, or spoil a possible victory? Why is life like the march of an army, and how may riches hinder the attainment of life's aim? Such questions should be considered in conversation between teacher and class, and

the teacher will do much to bring out the points, and at the same time to widen the literary outlook of his pupils, by quoting pertinent passages from other writers, as—

> "There is that maketh himself rich, yet hath nothing.
> There is that maketh himself poor, yet hath great riches."[1]

The whole essay will then be read in the light of these thoughts, and a true idea reached of Bacon's conception of the right attitude of men towards riches:

> "Seek not proud riches, but such as thou mayest get justly, use soberly, distribute cheerfully, and leave contentedly; yet have no abject or friarly contempt of them."

The pupils should be led to see the plan on which the essay is constructed: the place of riches; the true attitude towards them; the modes of gaining riches: and note how each is illustrated. The study may well end in the reading of Solomon's beautiful passage in the *Proverbs*—

> "Happy is the man that findeth wisdom,
> And the man that getteth understanding:
> For the merchandise of it is better than the merchandise of silver,
> And the gain thereof than fine gold.
> She is more precious than rubies:
> And all the things thou canst desire
> Are not to be compared unto her.
> Length of days is in her right hand;
> And in her left riches and honour.
> Her ways are ways of pleasantness,
> And all her paths are peace."

Example from Bacon on 'Studies.'

A consideration of this passage will well connect the essay on *Riches* with that on *Studies*, which will furnish abundant material for the study of a concise yet very effective prose style. Let the pupils mark the extreme brevity with which the ideas are expressed, yet a brevity in which each

[1] *Proverbs.*

word contains a world of meaning. This terseness will be brought home to them if they are called upon to express the same ideas when they note the number of words they themselves employ. Let them see how much the force of the style is enhanced by the constant comparisons and antitheses, and the use of striking figurative language, as—

> "Some books are to be tasted, others to be swallowed, and some few to be chewed and digested."

Example from Stevenson's 'Crabbed Age and Youth.'

As a last example, let us consider a passage from R. L. Stevenson's essay on *Crabbed Age and Youth*:—

> "'Opinion in good men,' says Milton, 'is but knowledge in the making.' All opinions, properly so called, are stages on the road to truth. It does not follow that a man will travel any further; but if he has really considered the world and drawn a conclusion, he has travelled as far. This does not apply to formulae got by rote, which are stages on the road to nowhere but second childhood and the grave. To have a catch-word in your mouth is not the same thing as to hold an opinion; still less is it the same thing as to have made one for yourself. There are too many of these catchwords in the world for people to rap out upon you like an oath and by way of an argument. They have a currency as intellectual counters; and many respectable persons pay their way with nothing else. They seem to stand for vague bodies of theory in the background. The imputed virtue of folios full of knockdown arguments is supposed to reside in them, just as some of the majesty of the British Empire dwells in the constable's truncheon. They are used in pure superstition, as old clodhoppers spoil Latin by way of an exorcism. And yet they are vastly serviceable for checking unprofitable discussion and stopping the mouths of babes and sucklings. And when a young man comes to a certain stage of intellectual growth, the examination of these counters forms a gymnastic at once amusing and fortifying to the mind."

The detailed examination of this piece cannot fail to be profitable both morally and intellectually. It brings home to the mind the nature and need of intellectual honesty, and its dependence on clearness of thought. The two similes should be worked out and illustrated, and the one reference unfamiliar to the children—that to the Latin exorcisms—explained. A comparison may profitably be made between the style of this passage and that of Bacon's *Essays* : the pupils will easily feel the greater freedom and familiarity of Stevenson's writing, and yet see that the foundation lines of construction are very similar.

Other Suitable Material.

Selected essays from Addison and Steele furnish much profitable material for study. Passages such as these, used judiciously with the elder pupils, tend to develop in them a taste for literature which expresses thought and feeling, as well as for the literature of romance which describes action. The teacher will find it helpful to keep a common-place book in which he copies out, or notes down references to passages he meets in his own reading and which strike him as suited for his pupils. Many such passages, when they are not found in the school reading book, are short enough to be written by the children in a manuscript book. Every child should be provided with a large book for this purpose, and thus form the habit of transcribing passages which specially appeal to him. Nor must such copying of passages be regarded as a waste of school time; it is a direct training in composition, and it shows the pupils one real use that the art of writing may be to them.

A Play of Shakespeare.

5. Such forms of literature as those we have considered will form the bulk of the school work in that subject. But in the highest class it is well to undertake a detailed study of one of the simpler plays of Shakespeare, such as *Julius Caesar*.

The same general lines of method will be followed as have been worked out for the passage from the *Idylls of the King*, though the second reading will here need division into two—one for the detailed examination of the matter, the other for that of the form. The pupils will have copies of the play for the first as well as for the subsequent readings, and the reading of the text will generally be by them.

The teacher should keep before their minds that the work they are studying is a play intended to be acted in a theatre, and that, in consequence, they must gather the story from the words put into the mouths of the characters, aided to some small extent by the indications of their actions furnished by the stage directions. This may, perhaps, be made more vivid if, in addition to any historical setting that may be necessary for understanding the matter of the play, some account of an Elizabethan playhouse is given as a setting for the general form, special reference being made to the arrangement of the platform-stage protruding into the body of the house.

An edition with an accurate, though, if needful, expurgated text, and entirely without notes, is the best. The teacher will, of course, use annotated editions in preparing his lessons, but it is best for each pupil to make his own notes in a manuscript book.

After the first reading the pupils should be required to write a brief analysis of the story, and to expand that into a well balanced narrative.

In the second reading more detailed attention will be given to the elements of the contents, that is, to the characters of the persons of the drama. Under the name of each of the chief of these the pupils should enter in manuscript books passages which illustrate their qualities. At the end of the reading the pupils should be able to write an essay on each character.

In the third reading the language of the text will receive more detailed study, and notes will be made in the manuscript books on the meanings of words and phrases, with occasional derivations and illustrations of similar uses by other writers of words now unfamiliar. Grammatical analysis will be applied to unravel the meanings of involved constructions. But all this linguistic work must be done with great restraint, the teacher always remembering that his aim is literary and aesthetic.

After this, some lessons may be given on the historical basis or other origin of the play, and the pupils may read with profit extracts from such books as Dowden's *Shakespeare Primer* or Hazlitt's *Characters of Shakespeare's Plays.* They will also now wish to know something of the life of Shakespeare, though the teacher must be careful lest biographical details which have no bearing on literary work loom too large. The common practice of beginning lessons on literature with a life of the author is so preposterous that one can only regard it as suggesting the law that the life of a custom bears a direct ratio to its absurdity.

If pupils studying a play of Shakespeare can see it well acted, much vividness and interest will be added to their conception. This is not always possible, and doubtless it tends to limit the imagination of the pupils to the actors' ideas of the characters. Nevertheless, as those ideas are the outcome of much more study than the children have given, the limitation imposed is likely to be wider than that the children have reached, for it must be remembered that to limit a possibility is not necessarily to curtail an actuality. It may be granted, however, that to see a play badly acted is worse than not to see it acted at all.

The two detailed studies of the play will of course be followed by a fourth consecutive reading. Scenes will, no

doubt, have been learnt by heart, some by one set of pupils, others by others. These may be acted, or at least recited, by the pupils who know them, with a greater freedom than is possible in mere reading.

Literature as illustrating Other Subjects.

6. We have merely attempted to indicate lines on which literature may be effectively taught. A complete detailed exposition of the subject would require many volumes. But the teaching will be most effective when the teacher works out the application of his principles for himself.

It need only be added that the cultivation of literary taste should not be confined to lessons definitely dealing with literature. Many other lessons can be brightened and vivified by a brief piece of poetry or a gem of prose description. Of such passages the teacher of other subjects should make a collection. For example, a lesson on mountains to the elder pupils which is enriched by the teacher reading well chosen selections from Ruskin's essay on Mountains in the *Frondes Agrestes* will have a culture value which the bare geographical treatment can never give it. A lesson on the Nile will gain by reading the sonnets to that river by Shelley, Keats, and Leigh Hunt. Life is given to a lesson on Venice by Shelley's lines:

> "Beneath is spread like a green sea
> The waveless plain of Lombardy,
> Bounded by the vaporous air,
> Islanded by cities fair;
> Underneath day's azure eyes
> Ocean's nursling, Venice lies,
> A peopled labyrinth of walls,
> Amphitrite's destined halls,
> Which her hoary sire now paves
> With his blue and beaming waves.
> Lo! the sun upsprings behind,

Broad, red, radiant, half reclined
On the level quivering line
Of the waters crystalline;
And before that chasm of light,
As within a furnace bright,
Column, tower, and dome, and spire,
Shine like obelisks of fire,
Pointing with inconstant motion
From the altar of dark ocean
To the sapphire-tinted skies;
As the flames of sacrifice
From the marble shrines did rise,
As to pierce the dome of gold
Where Apollo spoke of old.

Sun-girt City, thou hast been
Ocean's child, and then his queen;
Now is come a darker day,
And thou soon must be his prey,
If the power that raised thee here
Hollow so thy watery bier."[1]

[1] From *Lines written among the Euganean Hills.*

CHAPTER VII.

THE TEACHING OF ENGLISH: COMPOSITION AND GRAMMAR.

Language as a Means of Expression.

1. So far our consideration has been given to the culture of the pupils' minds by contact with some of the greatest creations of human genius; noble thoughts expressed in noble language which have inspired many generations of men, and will continue to exert their benign sway so long as men shall live to think and to understand thought. But it is in language also that the individual finds the most potent instrument for expressing his own individuality and for influencing others, and the instrument, moreover, most universal in its scope, for whilst not all are swayed by music, or painting, or sculpture, or architecture, all are influenced by language. Moreover, some power of expression is essential to appreciation of the expression of others.

Power of expression, like every other kind of skill, requires cultivation, and this it is the function of the school to give. Expression in language may be either by word of mouth or by written language. These should be developed together, and each in close connection with the reception of ideas.

Writing.

2. Before, however, discussing the work of the school in training expression through language, we must consider briefly the closely connected instruments of written expression—writing and spelling. One of the most common mistakes of schools is to forget that these arts are merely instruments, and to treat them as ends in themselves. Then each is cultivated for itself and largely out of relation to that art of written expression of thought which alone makes either worth teaching or learning. When their true relation to language is clearly grasped, this exaggeration of their importance will, no doubt, cease.

Method of Teaching.

In writing, as in reading, the senior school has only to build on the foundation which the infant school has laid. Writing is a manual art and, like all such arts, is acquired through practice guided by imitation with instructive criticism. Progress should be looked for in increasing correctness and facility of performance, with increasing automatism of process. As in all other manual arts, simplicity and clearness of model, gradation of difficulties, concentration of effort in imitation, and frequent short periods of practice are the essential conditions of rapid acquirement. Throughout, the nature of the end aimed at should be kept in mind—the power of legible, rapid, and mechanically automatic writing; and this should be gradually, but continuously, approximated.

Setting of Models.

The model should, especially with beginners, be set on the blackboard, for the children can then imitate both the result and the process by which it is reached, and the teacher can draw attention to the steps of the latter in some interesting chat as he goes along. The children should write on paper with lead pencils, which are easier to manage than pen

and ink, and preferable in every way to slates and slate pencils. Care should be taken that the pencil is held well, but it must be remembered that this new position of the hand is felt to be very cramping by little children, so it should at first be required for only a very brief time. After two or three minutes the hand should be rested whilst the teacher again writes on the blackboard, and the whole exercise should not last more than a quarter of an hour in the lowest classes. With practice the hand becomes more and more accustomed to the new position, which is, moreover, adopted more perfectly, and so the length of the lessons may be somewhat increased.

Holding the Pencil.

Much care should be taken from the first, and throughout the lessons, that the children sit in a healthy position—square on their seats, with backs upright and straight, feet firmly planted on the floor, forearms resting on the desk. No twisting to right or left, or bending over the desk should be permitted. That the writing should harmonise with this, the only healthy condition, it should be upright or very nearly so. Such writing has, moreover, the advantage of greatest legibility.

Position of Body.

The writing should at first be guided in size and uniformity by two parallel horizontal lines, but no further guiding lines should be supplied. To give too much mechanical help at first may conduce to better letters being produced at the moment, but hinders and delays the acquirement of the art of free writing. The size should be medium: neither too large, for the hands which are to produce it are small; nor too small, for the muscular co-ordinations in those hands are as yet too imperfectly formed, and the eyes are too imperfectly trained, to make very fine work of any kind suitable.

Guiding Lines.

Lines a quarter of an inch apart will give writing of about the right size.

Formation of Letters. In all acquirement of mechanical skill it is important that the same series of movements is always repeated to secure any one result. It follows that the same formation of letters should be used throughout, and that the formation should be chosen which best leads to the rapid legibility the writing should ultimately possess. Simplicity of form and ease of junction with other letters should be the characteristics from the first.

Analysis of Forms of Letters. Analysis of letters into simpler elements of form may be appealed to in the correction of errors. But such analysis should not be the foundation on which the writing is built up. For the muscular co-ordinations of actual writing are not practised when the elements are made separately, and the making of unmeaning shapes is of deadly dulness, and hence antagonistic to that concentration of effort which is an essential condition of success.

Capitals should be introduced as soon as the small letters can be made from memory. From the beginning stops should be included as an integral part of the writing.

Correction of Faults. Careful individual correction of faults is essential throughout, but such correction should never be in such a form as to discourage effort, and should never refer to more than one fault at once. Praise should be awarded in proportion to effort rather than to result, for it must be remembered that some children are naturally more deft with their fingers than are others.

Transcription. As soon as the children can form the letters from memory short exercises in exact copying of passages from the printed page should enter into their writing lessons. That by such exercises

spelling is also learned is no disadvantage. The teacher's corrections must deal with all errors of transcription, whether of spelling or of stops, but those relating to the writing itself should still keep to one fault at a time, though that will be of a more general nature, such as want of uniformity of spacing, than in the earlier writing lessons.

Use of Pen and Ink.

When the pupils can write readily with lead pencils, they should begin to use pen and ink. This introduces a new and very real difficulty, and the exercises set should, therefore, be such as the children can already do well with the pencil.

Use of Copy-Books.

When the children have reached the stage in which they can handle the pen with ease, the detailed instruction in the forms of letters should no longer be generally necessary, though an exceptional need may arise which requires to be dealt with on the blackboard. The chief aim now should be to increase rapidity without sacrificing legibility or beauty of form.

Here many teachers find engraved copy-books of value, though the objections to one engraved head line which the children copy over and over again down a page are obvious and serious. A really satisfactory copy-book gives an engraved model on every alternate line in the earlier stages, and one which fills every alternate page in the later. But with children who have advanced to the level of which we are now speaking, the use of copy-books, or of any other lesson dealing solely with the mechanical aspect of writing, should become less and less frequent, and the use of writing in connection with the copying of passages from books and with the direct expression of thought should more and more take its place. Copy-books are an intermediate stage whose object is to cultivate continuity and freedom of penmanship by giving models for direct imitation which

are immediately under the eye. Thus, instruction is better given from the blackboard when process is to be imitated as well as results, and from engraved copy-books, where model and imitation are very close together, when only result is to be imitated.

Practice in Real Writing.

As soon as the pupils can write with ease, regularity, and correctness of form, lessons on the form of writing have served their turn, and should be discontinued, though an occasional one now and then to correct some faulty tendency may be needed. Writing by this time should form so constant a part of the majority of lessons that an insistence on neatness and care will do all that is necessary. Much valuable time which is now commonly given to mechanical writing will thus be saved in the upper classes, and, moreover, the teaching of writing will itself more perfectly attain its true object, as the pupils will appreciate more fully the part which writing really should play in their lives.

Rapid Writing without Lines.

One other point only will we make. As the double guiding lines should give place to the single line as soon as possible, so the single line itself should disappear long before the children leave school. No doubt, at first the regularity of the product will suffer, but that is a necessary stage in the attainment of the power to write without lines. Nor will the irregularity be excessive if the pupils are not only allowed but encouraged to write as rapidly as they can consistently with writing well. The ideas that speed will come without training and that goodness of writing is in inverse proportion to speed are both wrong, for each disregards the characteristics of habit formation.

As the habit of any movement—for example, bicycle riding—is acquired, the natural result of practice is to increase speed, and soon the stage is reached when

limitation of speed actually decreases the perfection of the result. But if slow performance is continually persisted in, that also becomes habitual, and then the result is to render an increase of speed difficult. Now in teaching writing in school the first of these two stages is often ignored; the children are prohibited from writing at the quickest rate of good writing natural to them, and so they fall into the second stage, in which they find speed and goodness increasingly difficult to combine. Hence, the striking difference frequently found between copy-book writing and free writing and the equally striking deterioration of writing after school days are over with which we are all familiar are seen to originate in the mistaken notion that in writing development of speed is inconsistent with improvement in style.

Spelling.

3. Of the equally instrumental, and nearly equally mechanical, art of spelling little need be said. When once it is recognised that spelling is nothing more than memory drawing of the pictures of words, and is never required except when we want to write, it must be granted that it will be learnt primarily through practice in the correct drawing of words, and that it is only necessary to be able to spell the words we need to write.

Method of Teaching.

Practice in the correct writing of a word is, first, through direct imitation till the habit is formed; secondly, through reproduction by memory; and the end is secured when the result is produced automatically. Spelling is not directly learnt through rules at all, though rules discovered by comparison of different words may be applied to the criticism of faulty results, and hence, by concentrating attention on the form, aid its rapid acquirement. But the spelling memory is essentially a motor memory, and resides, so to

say, in the fingers rather than in the mind. To the extent to which one has to think how to spell words it is obvious that one is hindered in the expression of thought by writing, for the attention is withdrawn from the thought to the mere mechanism of expression.

Transcription. Bearing these principles in mind, the general method by which the child is led to acquire spelling is plain. The first exercises will be confined to the careful examination of the forms of words in a short sentence and the subsequent copying of them with perfect accuracy, attention being fixed in turn on each letter. The same words should be copied over and over again, and always in connection with the reading. The forms of written words are not in themselves attractive or striking. They, therefore, sink into the mind very slowly and only after much practice. The attainment of spelling power may easily be hindered by too great variety in the words first practised. If a child learns to spell one word a day on the average he will, if those words have been properly selected, have mastered the written form of practically the whole of his vocabulary in the first two years after he begins to read and write. What he writes he spells, and he writes nothing he has not already read.

Dictation. Reproduction of form by memory presupposes the power to produce the form with accuracy by direct imitation. Hence dictation should not be begun till a considerable amount of transcription has been done, and then should be confined to words and sentences which the children have frequently written from a copy. In all formation of habit it is important that the act should always be done rightly, so it is better to tell the children to leave a blank for words they cannot spell than to encourage them to guess at the form. Even after dictation is introduced it should be but an occasional exercise.

It is not a direct means of teaching spelling, though by concentrating effort on the correct reproduction by memory of forms of words it helps indirectly, and it also makes manifest both to pupil and teacher what forms need further practice.

Oral Spelling.

When the children know the names of the letters they may be encouraged to say them silently as they form the letters of new words as a help to concentrating their attention upon them, and so making the recognition of the elements of form explicit. Some children, too, remember more by associations of sound or of silent speech than by those of movement or of sight, and these are directly helped by such silent spelling. But to set children to spell orally and simultaneously a set of words they are not writing is very largely a waste of time. We do not acquire manual skill by describing the needful acts, but by doing them.

Word 'Building.'

What is called 'word building' is an attempt to base spelling on conscious logical processes. Now to think of the mechanism of an act when doing it is to prevent it from being well done. Let any doubter try the experiment when riding a bicycle or playing a piano. The mistake lies in regarding spelling as an end in itself and not as a mere instrument whose use is perfectly attained only so far as it has become automatic. There are, indeed, some few rules of spelling which the older children may gather from a comparison of instances, and these rules they may apply consciously when they want to write a word of whose form they are not sure, or when they examine critically the form of a word they have written. But the more these rules operate unconsciously the more perfectly they play their part. Hence, to keep the attention of the class fixed upon them too long is a mistake. It hinders the development of that

automatism which the teaching of spelling should aim at training.

Use of a Dictionary.

The habit of regarding spelling as an end in itself has led to much time being spent over it—as over mechanical writing—which could be much more profitably employed. Reading books have, indeed, frequently been written with the main object of presenting vocabularies of increasing difficulty to spell. Why anybody should think it desirable to teach a child to spell a word he will never need to write is inconceivable. Formal exercises in spelling should cease about the same time as those in writing, and the children should be trained to use a small dictionary to supply the spelling of any word they wish to use in writing and about the form of which they are doubtful. To secure accuracy of form at first in this way is much better than to trust to correction of wrongly written forms. Habituation in the use of a dictionary has other and obvious advantages in making the meaning of words more explicit, and so in keeping spelling in touch with the expression of real thought. Correction of wrong spelling should be insisted on in every piece of writing; but to set pupils to write for the mere sake of spelling is to reverse the relations of the two arts and to ignore the true province of each.

Function of Composition.

4. Passing by these "base mechanic arts" we must now consider how children may best be helped to acquire the power of expression in language. The mistake most commonly made is to teach 'composition' as a matter mainly, if not entirely, of form. This can do nothing but cultivate that use of language to conceal the absence of thought which so many of our public men appear to have carried to a fine art. The rule should be: "Out of the abundance of the heart the mouth speaketh," and the fundamental excellencies of good speech,

whether spoken or written, are tersely summed up in the advice on preaching once given by a bishop to candidates for ordination: "Have something to say; say it; leave off." Unhappily many public orators regard the first clause as superfluous, and the last as inapplicable.

The whole matter is admirably put by Mr. John Morley: "I will even venture, with all respect to those who are teachers of literature, to doubt the excellence and utility of the practice of over-much essay-writing and composition.[1] I have very little faith in rules of style, though I have an unbounded faith in the virtue of cultivating direct and precise expression. But you must carry on the operation inside the mind, and not merely by practising literary deportment on paper. It is not everybody who can command the mighty rhythm of the greatest masters of human speech. But every one can make reasonably sure that he knows what he means, and whether he has found the right word. These are internal operations, and are not forwarded by writing for writing's sake. Everybody must be urgent for attention to expression, if that attention be exercised in the right way. It has been said a million times that the foundation of right expression in speech or writing is sincerity. That is as true now as it has ever been. Right expression is a part of character. As somebody has said, by learning to speak with precision, you learn to think with correctness; and the way to firm and vigorous speech lies through the cultivation of high and noble sentiments. So far as my observation has gone, men will do better if they seek precision by studying carefully and with an open mind and a vigilant eye the great models of

[1] The context makes it evident that Mr. Morley means by 'composition' exercises in the mere form of expression.

writing, than by excessive practice of writing on their own account."[1]

Need for Specific Training in Expression.

5. That the mutually dependent powers of clear thinking and precise expression do not come by nature is evidenced by the large number of people who never attain either, and all who have studied children know how they are addicted to suggesting or hinting at their meaning rather than to expressing themselves fully and clearly. The school should, therefore, cultivate these powers always in connection with each other, and every lesson furnishes opportunities for doing this. For expression in speech of what is in the mind is not an occasional fact in life, but a constant activity. Every exercise of this, as of other activities, helps to form a habit of doing it well or ill. Consequently, it is needful for children to be led to make a conscious effort to do it well, and to avoid the errors to which they are prone. This is the justification for special lessons in the use of language.

Oral and Written Expression.

6. It is further evident that, as the formation of good habits should be begun as soon as possible after the activity becomes conscious, training in speech should be given even before the child learns to read, and training in written language as soon as he has mastered the elements of the mechanical art of writing. Further, that training in both oral and written expression should be continued throughout school life. These are often regarded as mere duplicates of each other. They have, however, somewhat different functions, expressed with epigrammatic terseness by Bacon when he wrote: "Reading maketh a full man; conference a ready man; and writing an exact man."[2]

[1] *Essay on The Study of Literature.*

[2] *Essay on Studies.*

We have seen that in the infant school readiness of speech is the chief result to be aimed at, and that corrections of form should not be so insistent as to check the freedom of the child's utterances. And always in oral expression, copiousness, general arrangement and intelligibility are of more importance than the more detailed niceties of choice of word and phrase. These are mainly dealt with in written work or in oral exercises in immediate connection with written work. In the oral reproduction of what has been heard or read, or description of what has been experienced, then, the teacher should incidentally correct grammatical errors, ambiguous constructions and confused arrangement, but should not discuss the relative claims of various words and phrases. The incidence of attention should be on the matter, and almost any form should be accepted which conveys a sufficient, clear and accurate impression of that matter to the minds of the hearers.

Special Lessons in Language.

7. The special lessons in language, however, put the incidence of attention on the form. Hence, the ideas to be expressed should be such as are sufficiently familiar to need no further effort at apprehension. The exercises should be graduated primarily on the basis of an increasing complexity in the matter to be expressed. Increased complexity of idea demands increased complexity of expression, but complexity of expression without corresponding complexity of idea is meaningless and artificial.

Early Lessons.

With the youngest children, then, the ideas to be expressed should be very simple, such, indeed, as can be adequately expressed in a single sentence. Of course the children should not be asked to 'make a sentence,' but to state a fact. For example, the teacher or one of the children may do some simple action,

such as opening a door or window or taking up a book, and the children may be asked to tell what has been done. They reply orally, and the various answers are examined critically by the class with the specific aim of telling the fact in the plainest and neatest way. The final result is written on the blackboard and copied by the children. After a little practice the children may sometimes be allowed to write such simple statements without the preliminary oral discussion. In this manner the most common forms of sentence construction become familiar, and the beginning is made of a habit of critical selection of words.

The Paragraph.

Soon the children advance beyond single sentences to their combination in a paragraph. Indeed, it is better to regard the paragraph as the unit of composition throughout, and the earliest exercises as single sentence paragraphs. The first step may be to take a familiar object or simple picture, and ask the children to answer questions about it. These questions should be carefully prepared so that their combined answers give a methodical account of the object. Each answer is given in a sentence which is discussed as before, and the final form written on the board, of course with the proper stops. The whole is now examined, and by reading it aloud the children will perceive that it is jerky in form, owing to the independent origin of each sentence. They may then be led to modify this by the substitution of relative for absolute words and the insertion of connective words. This must not be carried too far at first, or the opposite result of a long, rambling discourse with its elements connected everywhere by 'and' may result. In a similar way, accounts of simple school events with which all are acquainted may be worked out and expressed in the form of a letter. Reproductions of

parts of lessons may be similarly dealt with and will furnish abundance of varied material.

In the earlier exercises the questions should be given orally, and each should be answerable in one simple sentence. As the pupils' power increases the questions will become wider, so as to demand more and more effort and skill in constructing the answers, and may well be written on the blackboard, so as to be on view whilst these more complex answers are being discussed. In the discussions the aim should be to lead the children beyond the mere vague feeling that one construction, expression, or word is better than another—though that will be the starting-point—to seeing a reason why it is so. For it must be remembered that speech, though often guided by emotion and feeling, is essentially an intellectual art. Some knowledge of grammatical analysis will be found very helpful in the criticism. As skill is attained exercises in which the pupils write answers to questions written on the blackboard without the oral discussion, and in which, consequently, each individual freely works out his own thoughts, will become more frequent.

Use of an Outline.

A higher stage is reached when, without such definite questions, an outline is drawn out in conversation, written on the blackboard and used as a guide to the composition. Here the pupils are first called upon to apply the results of the imitation of arrangement of ideas which has been implicit in the preceding exercises to making such an arrangement for themselves. The first exercises of this kind may appropriately be the reproduction of a story told or read, or a part of a recent oral lesson, when the required arrangement is in its main outlines a matter of intelligent memory. Of course, the reproduction should not immediately follow the reception, especially in the case of a

story, or mere mechanical memory is likely to play too large a part.

The drawing up of outlines by the co-operative efforts of the class should be continued in all subjects in which the result to be attained is a logical arrangement of matter known in common by the pupils, until every pupil has an insight into the principles on which such arrangements are based. But gradually the blackboard outline will grow shorter and more general, and will be completed by the pupils individually. At last the time is reached when each pupil can draw up his own outline for himself. The attainment of this power is, of course, much facilitated when teaching with text-books largely takes the place of oral lessons. For in his text-book the young student has his matter, and in the general questions to which his teacher has set him to find answers he has the general form to which that matter has to be adjusted. So he learns to write brief synopses of the chapters from various points of view. Of course, he has the book before him to refer to when writing his summaries, and in that way is acquiring the power of really using books as means to attain his own purposes.[1]

Individual and Imaginative Exercises.

So far we have confined ourselves to matter in which arrangement of ideas may be made in common. But side by side with such exercises there should also be others to which such common work would be fatal, as they appeal to the imagination of the children, and all imagination must be individual. These may be introduced when the children are about nine or ten years old, for by that time they should be able to write a page of intelligent and fairly well expressed English.

Simple forms of exercises of this kind are asking the

[1] *Cf.* pp. 82-4.

children to finish a story of which the first part has been read to them; to write a story analogous to one told them; to write a story which would be illustrated by a simple picture; to write a story suggested by a few bald statements, or even by single words, as, for example, boy, man, dog, bull, field, river; to write a letter describing an imaginary incident. It should be remembered, however, that imagination grows out of imitation, and is guided by knowledge. There is no value in letting the children simply produce the riotings of untrammelled fancy. Hence, some inner consistency should be looked for in all imaginative productions.

Influence of Reading on Expression.

8. A course on the lines which have just been broadly sketched should succeed in keeping expression united with thought, in securing some power of arrangement of thought, and some facility in lucid expression. However, it must be borne in mind that speech, spoken and written, is largely a matter of imitation, and that the results attained will, therefore, be in direct relation to the value of the models set before the pupils in the books they read and in the teacher's speech. Such detailed examination of pieces of literature as was described in a previous chapter[1] will have a very real, if not immediately apparent, influence on the formation of style; for many lessons will incidentally be learned as to construction, use of words, employment of illustration, and harmony of general effect.

Correction of Exercises in Composition.

9. A few words must be said on the teacher's examination of the written exercises. In a large class this is obviously a matter of practical difficulty, yet unless it is done effectually improvement is hindered. The short exercises of the youngest classes present no difficulty. They can generally

[1] *See* pp. 151-9.

be examined as the teacher walks round his class whilst the children are writing, or immediately they have finished. But as the exercises become longer they cannot be so marked. It is obvious that no examination will be satisfactory except that of the teacher. Time can generally be found for it whilst the pupils are engaged in silent reading, so that but little will usually be left to be done out of school hours. In no case would a teacher be justified in exhausting his vitality by giving too much of his spare time to this marking. It is better to mark thoroughly half the class in one exercise and the other half in the next than to mark the whole each time in a perfunctory manner. But exercises in which the composition has been first done orally, or those in which the outline has been worked out by the whole class, take little time to read and mark, and long exercises in which this has not been done will only become frequent as the pupils get that power of expression which makes serious faults infrequent.

Much time is saved if the teacher and class have a recognised system of signs. An underlined word may mean a mistake in spelling, a *C* in the margin a fault in construction, a *G* a piece of bad grammar, and so on. The teacher then only writes these signs and returns the exercises to the pupils, who, in the next language lesson, set to work to correct them, the teacher passing round and helping where he finds need. No careless work should ever be examined at all, but the offender should be set to do it again. Children can soon be brought to understand that the school calls for careful effort, and will be satisfied with nothing less. If any one kind of error is common in a set of exercises the teacher will do well to discuss it orally with the whole class.

10. There remains to decide the place which study of English grammar should hold in the primary school.

Function of Grammar.

The subject has become generally unpopular with both teachers and scholars, and is banished from the curriculum of many schools. And if by grammar is meant the mass of verbal subtleties and logical inconsistencies which have too often passed under the name, its disappearance is in every way a gain. Nevertheless, there is not only use, but need, for a grammar which aims at making explicit the structure of the speech in which our thoughts must be expressed. Such a grammar is subordinate and instrumental. It enables the pupils to criticise intelligently the construction of sentences, to separate them into their constituent elements, and, if desirable, to rearrange those elements into a new whole.

The most common mistake in the teaching of grammar has been the overloading it with distinctions derived from highly inflectional languages, but largely inapplicable to an analytic language like English. In such a language it is not the forms but the functions of words to which attention should be directed. For all meaning is expressed in continuous speech, and the constitutent parts of such speech, whether sentences or clauses or phrases or words, get their full force and meaning only in relation to the whole. Of any constituent piece of discourse the important grammatical question then is: What is its relation to the other constituents and to the whole?

It follows that the grammatical examination of language which should find a place in school is never merely verbal. It is always an inquiry into meaning and into the adequacy with which meaning is expressed. When thus regarded it is seen to be often helpful, and at times needful. For the great weakness of an analytic language, as a means of expressing thought, is its liability to ambiguity of construction. No language offers more pitfalls of this

kind for the unwary than English, and, it may be added, in none is more frequent advantage taken of them.

The function of school grammar is, then, to help the pupils to get a clear and distinct apprehension of thought when it is obscurely expressed, to see the origin of the obscurity, and, as a consequence, to develop power to avoid similar weaknesses. Of course, grammar by itself will never do this, but when it is kept in close touch with the other studies in English, and especially with composition, it is a valuable auxiliary.

When this principle is grasped, teachers will stop the grammatical analysis at the point where it ceases to help in making the construction of sentences clearer. They will thus avoid wandering into those minute verbal distinctions and classifications, the application of which hinders rather than helps the object in view. It is not needful to be always teaching something new. Like arithmetic, the value and function of grammar are mainly found in practical applications of a comparatively few general ideas.

Again, it should be remembered that grammatical analysis is a severely intellectual act, and is therefore, in itself, opposed to the emotional influence of literature. It should not, therefore, be applied to passages whose effect we desire to be mainly emotional or aesthetic. Indeed, it is only occasionally that the appreciation of a sentence in real literature will be aided by analysis. The pupils may learn the use of the instrument on less worthy material, and, when they are proficient in it, may use it to help them both in understanding involved passages in their reading and in criticising their own productions. But to analyse and parse a sonnet till we have reduced it to a mere mass of logical relations, till, indeed, it has no form nor beauty that we should desire it, is to commit an outrage both on

literature and on the children who are called upon to take part in the process of dissection.

Principles of Teaching Grammar.

11. A syllabus of grammar suitable to a primary school would, then, be arranged on the basis of increasing differentiation of function, beginning with the most important relations, such as concord of nominative and verb, and gradually working down to more detailed distinctions. The teaching will always be oral, and inductive in character. From examination of examples the pupils will be led to see the value and meaning of the distinctions made, and to formulate general statements of them.

No regular course in historical grammar is desirable, but interest may frequently be added to lessons in literature, geography, and history by tracing the history of certain words when that history bears upon some aspect of life or custom.

No doubt, some teachers will teach more grammar than others. We have only attempted to lay down the broad principles upon which the teaching should be based. What may be regarded as a minimum, yet sufficient, course will be found outlined in the following chapter.

CHAPTER VIII.

THE TEACHING OF ENGLISH: SUMMARY.

Summary of Principles.

1. WE will now gather together the threads of our discussion of the teaching of English by summarising the principles which have been operative in it throughout. They are:—

(i) That all the studies included under the term 'English' should form an organic whole, and be so taught as to aid and illustrate each other.

(ii) That the main purpose in teaching children to read is to help them to acquire both the wish and the power to read good literature after they leave school: to this the elocutionary aspect of reading is subordinate.

Consequently—

(*a*) Reading in silence, followed by conversation on what has been read, should form an integral part of school work in all classes above the infant school.

(*b*) The contents of the reading books is of prime importance: it should be varied and interesting; imaginative and humorous; instructive only in the sense of organising thought and knowledge, and in suggesting lines of inquiry.

(iii) That learning by heart should be the natural outcome of delight excited in the pupils by passages which appeal to them, and should, therefore, be a constant feature in the work.

Consequently—

It is a mistake to fix a number of lines to be learnt by each child in a given time. This tends to separate recitation from literature, and to reduce the learning by heart to a mechanical exercise: the minimum, after being prepared, is repeated till the children get thoroughly weary of it.

(iv) That verbal expression passes through the broad stages of reproduction, imitation with variation, and origination, and is a power exercised by the child before he comes to school.

Consequently—

(*a*) Children should from the first be trained in expression by speech, and this oral work should be continued throughout the school course, confined mainly to reproductive expression.

(*b*) In written composition practice should be given both in arranging and expressing knowledge and in giving form to original and imaginative ideas.

(*c*) That pieces of literature should be examined with respect to their form, so that there may be conscious adaptive imitation of good models.

(v) That spelling is merely instrumental to writing, and writing to the expression of thought.

Consequently—

(*a*) Spelling should be made subordinate, and should be taught mainly by transcription of passages expressing familiar thoughts in familiar words.

(*b*) Written compositions should form part of the regular work as soon as the mechanical art of writing has been fairly mastered, and the chief practice in writing and spelling should thereafter be by means of such compositions.

(vi) That grammar is mainly instrumental in the work of the primary school. Its functions are to help the pupil to disentangle passages which are obscure and confused to him, by making explicit the connections of thought, and to criticise his own productions.

Consequently—

School grammar should be essentially analytic, and should omit all elaborate distinctions of 'parsing'—distinctions often adopted from Latin, and really inapplicable to a language in which inflections are few.

(vii) That from one-fourth to one-third of the school time should be given to the study and practice of English.

Outline Course of Study.

2. We will end by illustrating how these principles may be applied in the drawing out an outline course of study for a primary school. It will be understood that the work of each group is graded and merges gradually into that of the group above.

I. *Lower Classes* (*ages* 7-9; *First and Second Years*).

(i) Reading and telling of suitable stories by the teacher.

(ii) (*a*) Reading aloud from books containing such matter as nursery and fairy stories. The books should be sufficiently numerous to prevent the lessons being learnt by heart by continual re-reading.

(*b*) Reading silently of passages, with conversation following. Additional books should be provided in a class lending library which the children should be encouraged to read at home.

(iii) The reading books should contain simple short verses suitable for young children, some of which

should be learnt by heart. This learning should be individual.

(iv) (*a*) Answering questions on matter read, and on meanings of passages, phrases, and words.

(*b*) Oral reproduction by individual children of simple stories read in class or at home, either orally or silently, or told or read by the teacher.

(*c*) Oral reproduction of portions of lessons.

(*d*) Relation by children of incidents in their own experience.

(*e*) Talks about simple pictures, *e.g.* those in the reading books.

(v) (*a*) Formal writing lessons dealing with the formation of letters, both small and capital, figures, and punctuation marks.

(*b*) Transcription of written and printed passages.

(*c*) Occasional dictation of carefully prepared passages containing no words whose written form is not familiar to the children.

(*d*) Simple written compositions based on answers to questions, and discussed orally in class before being written.

II. *Intermediate Classes* (*ages* 9-11; *Third and Fourth Years*).

(i) Reading by teacher of suitable stories and passages both in prose and in verse.

(ii) As under I., but amount of silent reading continually increasing. One of the reading books should be historical.

(iii) Similar to I., but longer and more advanced passages learnt.

(iv) Similar to I., but with continually increasing demands as to fulness and arrangement of matter and fitness and correctness of expression.

(v) (*a*) More advanced than I., and decreasing in amount till each kind of exercise disappears as children attain proficiency.

(*b*) Written compositions, beginning with simple answers to questions, extending to narratives and descriptions, gradually increasing in length and complexity. The writing of simple letters dealing with children's actual experiences. Such exercises generally to be preceded by oral discussion and the drawing out of an outline. Simple and brief imaginative compositions, such as the invention of a short story, suggested in fairly obvious ways.

N.B.—The greatest possible variety in written composition exercises to be aimed at. Some such work to be done daily.

(vi) Grammar.

(*a*) Division of all sentences into subject and predicate.

(*b*) Subdivision of logical predicate into verb, object, and adverbial adjunct, together with noun, adjective, and pronoun.

(*c*) Tense, person, and number in connection with concord of nominative and verb; case.

N.B.—1. At this stage 'adverb,' 'adjective,' 'noun' will be used indiscriminately for word, phrase, or clause: it is the function of the elements of the sentence that is to be studied.

N.B.—2. In most schools it would be inadvisable to begin this work before the Fourth Year.

III. *Higher Classes* (*ages* 11-14; *Fifth, Sixth, and Seventh Years*).

(i) Reading by teacher of pieces of beautiful literature.

(ii) Reading both silently and aloud from books containing stories, passages from literature of descriptive, narrative and declamatory character, essays and poetry. One at least of the books read by each child should be one continuous story, and one should be historical. Others should contain varied selections of different length, but all of literary merit. A class library should be regarded as indispensable.

(iii) (*a*) The intensive study of selected passages of prose and poetry, and, in the highest class, of a play of Shakespeare. Attention to points of style, meaning and interpretation of figurative language.

(*b*) Learning by heart, and recitation of passages of poetry and prose. Each such passage to form an artistic whole, but, as a rule, to be of only moderate length. The passages should be varied both in matter and in style. The learning should be individual and voluntary.

(iv) Similar to I. and II., but with continual improvement in fulness and style.

(v) Written compositions similar to II., but of a more advanced character. Especially more advanced original and imaginative compositions, such as the completion of an unfinished story, the composition of a story suggested in various ways, letters describing imaginary incidents, parodies. Writing of synopses of matter read.

Finding answers to questions by reference to books indicated by teacher.

(vi) Grammar.

(*a*) Distinction of word, phrase and clause, together with relative pronoun (now first distinguished as a class apart), conjunction and preposition.

(*b*) Application of (*a*) to analysis of complex and compound sentences, emphasis being placed on relations of clauses.

(*c*) Cognate words and their formation from, or relation in form to, each other.

(*d*) Investigations into exact definitions of some common words and into simple examples of reasoning. These exercises to be done Socratically, the value being in the process rather than in the result.

The following books are recommended to the teacher :—

On Reading Aloud:

Burrell: Clear Speaking and Good Reading	2/6 (Longmans).

On the Teaching of English:

Carpenter, Baker, and Scott: The Teaching of English in the Elementary and the Secondary School	6/- (Longmans).
Wilson: Lingua Materna	3/6 (E. Arnold).
Hinsdale: Teaching the Language Arts	4/6 (Appleton).
Laurie: Language and Linguistic Method	4/- (Oliver and Boyd).
Board of Education: Suggestions for the consideration of Teachers, pp. 28–39	-/8 (Wyman and Son).

On the Selection of Matter:

Stopford Brooke: Primer of English Literature	1/- (Macmillan).

Dowden: Shakespeare Primer ...	1/-	(Macmillan).
Hazlitt: Characters of Shakespeare's Plays	1/-	(Dent).
Harrison: The Choice of Books ...	4/-	(Macmillan).
Morley: Studies in Literature—Essay on the Study of Literature	4/-	(Macmillan).
Vaughan: English Literary Criticism	3/6	(Blackie).

CHAPTER IX.

THE TEACHING OF MUSIC.[1]

Function of Music Teaching.

1. Music as a subject of instruction occupies a somewhat unique position. While many of the subjects of the curriculum have a direct and practical bearing on the everyday business of life, others are, or should be, mainly or entirely a source of pleasure, and amongst these music stands in the first rank. The study of music, indeed, provides valuable incidental occasion for activities which are more directly exercised in other studies; but it is most essential for the teacher to remember that unless music be regarded rather from the point of view of relaxation than from that of business—using this word in its scholastic sense—its true function will be abrogated.

That music is an expression of emotion is one of the commonplaces of musical philosophy. It comes natural we say, for children to sing, and in so far as the teacher bases his instruction on the principle of cultivating this spontaneous musical experience he will be building on a foundation which will bear any superstructure that further study can rear upon it. If, however, the teacher proceeds on the assumption that his main concern is to teach the child to solve various rhythmic conundrums in pitch and rhythm, thereby treating the subject from the standpoint

[1] By R. T. White, Mus.Doc.

of an exact science, the child will regard it as such, and spontaneity—the very essence of music—will be checked at the outset.

Moreover, one cannot altogether disregard the fact that with a child who is naturally musical—and there are more of these in the world than is commonly supposed—the practice of the art will occupy a large share of his attention after his school days are over. There are very few subjects of study of which this can be said, and it is therefore a matter of importance to consider how best we can make our school music lessons a stepping-stone to future advancement in the art.

There is another consideration to be urged in favour of music, and one which has great weight with those who realise the dangers which beset young people when first they go out "into the world." A youth who has no social accomplishment feels awkward and out of place in good society, and too often seeks relaxation in directions which do not lead to refinement of character. But if he has attained to some degree of proficiency in either vocal or instrumental music he is sure of a welcome in any intellectual circle, for music is the most sociable of all arts. Hence, if during school life we can lay a good foundation for further study in music, and, above all, inculcate a real liking for it, we shall be giving our children an equipment which will be of inestimable value to them in a critical period of their lives.

Objects of the Study of Music in Schools.

2. The objects of the study of music in schools are, then, first to develop and cultivate that liking for music which the vast majority of children possess, and, secondly, to facilitate, as far as is consistent with the first-named object, the acquisition of some technical skill in the making of music.

Unfortunately, many schemes of instruction in the past have inverted the order of these aims, and have been almost entirely concerned with the technical side; with the inevitable result that there is quite an army of young people who can sing or play fairly correctly but are entirely devoid of that indefinable but very real quality, musical taste. The result is seen in the worship of prodigies of almost superhuman technique, and the lack of appreciation of artists whose musical insight is superior to their mechanical dexterity. Any improvement in the popular musical taste which manifests itself in this country in future years will be due, in a large measure, to the influence of the teachers of music in the primary schools.

The cultivation of musical taste opens up such a wide field of inquiry that the limits of this chapter preclude more than a hasty survey. First of all, musical taste presumes that its possessor has been habitually confronted by good models. The taste of a child who has heard nothing but the comic songs of the day is not likely to be very refined. Hence the teacher must seize every opportunity of providing good music for his pupils. But what is 'good' music? A definition would be difficult to frame. Good music is not necessarily complicated—indeed, some of the music which is universally acknowleged as fine in every sense, such as that of many of our hymn tunes, is perfectly simple.

The chief characteristic of good music is that one never grows tired of it. It will appeal with added force at each repetition; new beauties will reveal themselves. Hence, if a melody which at first seemed particularly attractive grows less so when repeated, it is fairly certain that it does not fully satisfy the canons of good taste. Of course the personal equation must enter largely into taste. It would not be wise for the teacher to present classical

examples indiscriminately to his class; the age of his pupils and other circumstances must be taken into account.

Again, it is a great mistake to expect the members of the class to do all the music-making. The teacher himself should be capable of giving a simple vocal or instrumental performance occasionally, and it is rare nowadays to find a school staff on which there is not at least one member efficient in some branch of music. It is rightly enough being recognised that the music lesson should not be entrusted to a teacher who is not really musical, and, if it can be arranged, the most musical member of the school staff should superintend all the music lessons.

School Choirs.

3. In large schools it is possible to form a school choir consisting of the best pupils from each class. With proper safeguards this is an excellent plan. Such a choir will naturally be able to reach a higher standard of musical attainment than will any of the ordinary classes, and will demonstrate to these what is possible in the direction of vocal music. Admission to this choir should be looked upon as a privilege, and also as a right belonging to any child who gives evidence of good progress. School concerts, occasionally given, also supply a stimulus to the young vocalists to put forth their very best efforts. Human nature being what it is, some incentive of this kind is necessary if a high standard of excellence is to be attained.

School Orchestras.

4. Only rarely is it possible to organise school orchestras. Such orchestras as do exist—with a few rare exceptions—certainly do not contribute towards the formation of a good musical taste. The difficulties met with are of such a character as cannot fairly be dealt with in schools, and had better be encountered outside.

5. Once again, since the cultivation of taste presupposes the continuous presentation of good models, it follows that great care must be taken in the choice of exercises and songs. With regard to the latter a very wide field of choice is open. Of late years all musical publishers of note have exploited this field with excellent results. It would be invidious to particularise, but a teacher who pays a visit to Messrs. Novello or to Messrs. Curwen will find hundreds of really good songs from which to choose. Nevertheless, some discrimination will be necessary.

School Songs.

There has been a movement recently in favour of making the so-called English 'Folk-song' the staple food in the way of songs for primary schools. Unfortunately, there are not very many of these true 'folk-songs' now available; and most of the 'national' songs are unsuitable. The traditional tunes are, generally speaking, of a high order of merit, but the words are too often of a character which unfits them for school use. It is only necessary to examine a comprehensive selection in order to realise the force of this objection. However, there remain a few which do not err in this respect, and these should be taught in every school. The words of songs always require consideration before they are selected for class purposes. Children will take a liking to a song independently of its tune if the words are attractive, but few tunes have sufficient charm to make their way if wedded to words which are unintelligible.

The appreciation of pure instrumental music seems to come rather late in a child's life, unless he is making it himself, and then the pleasure is not entirely musical. This perhaps accounts for the fact that many classical songs do not always win their way as might be expected: the melody may be charming, but the elaboration of the

accompaniment and the lack of directness in the words fail to commend the songs to young people. Few teachers would be foolish enough to select 'love-songs' for class purposes, but it is just as incongruous to ask children who have no living idea of a mountain or the sea to do justice to a song apostrophising these natural objects. Moreover, it should be remembered that no singer can give a good rendering to a song unless he can recite the words intelligently and forcibly, which he certainly cannot do if he does not fully understand and appreciate the sentiment.

When considering the suitability of a song from the melodic standpoint it is important to notice that pupils taking the first or second year's course must not be confronted with any but the simplest rhythms and smooth melodic outlines. The standard of difficulty of the songs should always be somewhat lower than that of the exercises.

Then, again, it must be observed that some melodies are quite difficult and entirely ineffective without an accompaniment. This point is too frequently overlooked. If the melody of a song is intended to be sung without its proper accompaniment, this accompaniment ought not to consist of rapidly changing chords, because the omission of these will leave a sense of bareness. If, however, the accompaniment is formed of only a few chords constantly recurring—it does not matter if these chords are spread out into *arpeggi*—the melody itself usually contains a suggestion of the harmony, and the accompaniment is not so much missed.

Again, the songs included in each year's course should be chosen from two standpoints. There should be some for detailed study, that is, songs whose beauties will reveal themselves more and more as they are better known; and there should be others of the recreative order, chosen, that

is, because the children will get healthy amusement from singing them. It is quite possible that the teacher will find that he has miscalculated the taste of his class when choosing a song of this second type: in that case he should not force this song upon the class, but quietly let it disappear from his scheme and substitute another.

Songs of this type should, even in the upper divisions, be sung in unison, except that perhaps the refrain, if there is one, may be sung in 'parts.' An accompaniment of course adds to the enjoyment, and it is a mistake to get an excess of refinement into the rendering; more than a suspicion of *abandon* is desirable. Of course, this does not imply coarseness.

Singing by Ear.

6. This type of song should be taught by ear, at any rate in the lower classes. In the very laudable anxiety to teach every child to read musical notation, we have somewhat overlooked the value of the more empirical method of teaching singing. After all, this is the way we learn to talk, and we talk before we can read. In fact, the one object of learning to read music is to entice the pupil to make himself acquainted with musical literature of which he would otherwise remain ignorant. But at the same time it is possible to obtain more than a passing acquaintance with musical literature without being able to read it; much of folk-song music is unwritten, albeit those races which are by general consent regarded as highly musical are those which possess a vast storehouse of these traditional tunes. Too often syllabuses in music are apparently designed with the main idea of teaching children to *read* music, not to show them how to *render* it so as to obtain therefrom the maximum of enjoyment. Moreover, 'singing by ear' presumes a good deal of ear training of a valuable kind.

The method of teaching a song by ear is a fairly obvious

one. The first line or phrase is sung two or three times by the teacher and repeated by the class; the second phrase is then attacked in the same way and then both the phrases together, and so on through the song. If any awkward melodic intervals occur, they should be referred to the modulator, and any unfamiliar rhythms should be analysed separately. The melody can be learnt independently of the words, although it is often easier to teach both together.

The tunes thus taught can and should be utilised incidentally in the following way—

(*a*) If the rhythms have been already learnt in the ordinary course they should be identified and written down

(*b*) The tunes can be used as voice exercises to the open vowels.

(*c*) The various melodic phrases can be used as ear tests and pointed out by the pupils on the modulator or written down.

(*d*) The most musical pupils can be invited to write down the tune in full.

(*e*) Generally speaking the tunes can be used as standards to which many difficulties occurring in other directions of musical study can be referred.

There is another consideration to be borne in mind in connection with singing by ear. In the opening paragraph it was maintained that the chief principle underlying the study of music in schools is not that the children should acquire musical knowledge—though this is certainly a secondary object—but that they should be guided so that they can enjoy music as an art rather than as a science. Clearly this condition will be most nearly fulfilled in that part of the lesson devoted to singing by ear. Few pupils can obtain much pleasure from the mere deciphering of

musical symbols, except in so far as they anticipate some enjoyment in the future derivable from the increased facility in the reproduction of musical sounds which such practice ensures. There certainly is an intellectual side to music, for example the principle of Form, but this is quite beyond the comprehension of young children; to these it is the emotional element which appeals.

Part Singing.

7. The power of harmony to enforce the beauty of melody is generally recognised; moreover, harmony considered by itself, as, for example, in a sustained chord, has a special charm. An elementary study of chords should be introduced into the curriculum from the earliest stages. They should be sung softly, so that each singer can hear the whole chord, and not only his particular note. The simplest chord is of course *d m s*, and in whatever order these notes are arranged the result will always be a harmonious chord. If the teacher bears this in mind, a little ingenuity will enable him to devise a great variety of useful exercises. For instance, the class can be divided into halves; the members of one division can hold between them the notes of the chord, while the rest can sing a melody founded on the notes of the chord. Or one half of the class can sing the *arpeggio* upwards, while the other sings it downwards, two-part harmony thus being formed. These exercises should be rhythmic. Too often rhythm is excluded from exercises in tune, rhythm being treated as if it were merely invented to furnish material for the construction of 'time-tests.'[1] Melody without rhythm is incompatible with our modern musical system.

The easiest, and at the same time one of the most interesting forms of part-singing is the 'Round.' In fact, if it were not for the round, the opportunities for real

[1] See p. 210; *cf.* pp. 214-9.

part-singing in schools would be rather limited, as the restricted compass of the voices precludes the possibility of introducing harmony of the conventional kind. It should, however, be noticed that there is a tendency in singing rounds for the singers to forget the canons of voice production in their anxiety to keep their own part. This must be checked by keeping the amount of tone below *forte*.

Part-singing of the usual type, that is treble and alto, is an important accomplishment, no doubt, but the plan frequently adopted of setting the best pupils to sing the lower part or parts simply because they can read fluently, regardless of the compass of their voices, is ruinous to the singing of the class as a whole. Treble voices must sing treble and alto voices must sing alto; if there are no alto voices in the class, then there must be only unison singing. There is nothing to be gained by trying to convert a good treble into a bad alto voice. A pupil's voice should be tested on entry into a class, and again after two or three months' interval, as the voice with practice will sometimes develop differently from what one might expect.

As far as songs are concerned, the ordinary teacher will find it best not to attempt three or four-part work. The lowest part is generally too low or the highest too high for satisfactory tone production, although occasionally a song not open to these objections is met with.[1] The best plan is to take three and four-part rounds in the higher divisions; in these the above difficulty is not encountered in so aggravated a form.

Ear Training.

8. Stress is rightly laid upon ear training as a branch of musical instruction. The ability to sing any note asked for is obviously bound up with the power of recognising this note when sung by

[1] *Eighteen Easy Two-Part Songs* (Novello) is specially recommended from the standpoint of moderate compass in both parts.

another. However, it is a mistake to relegate this training to a special part of the lesson—it can be more profitably introduced during the course of the lesson. Ear training should not be restricted to the pitch of notes; rhythms should occasionally be written down by the class when sung or rapped out by the teacher. This should go *pari passu* with the reading of rhythms from the blackboard. The children may well be invited to invent rhythms for themselves, and the teacher can clothe these with melody and have them sung by the class.

Voice Training.

9. This chapter is not intended for teachers of solo-singing, therefore the remarks made about voice training must be of a general nature. The demands made by other subjects upon school time do not permit of special lessons in voice training, so that this must be taught to a certain extent incidentally. Every music lesson should in itself be a lesson in voice training, that is, the exercises as well as the songs must be sung artistically, not merely correctly.

The one essential of good tone production is control of the breath. This, in a vocal sense, is not usually acquired naturally. In ordinary life we seldom or never fill our lungs to their utmost capacity, and the emission of breath is generally a passive act—we do not consciously control it. If we do so, it is usually by closing the throat. Now this procedure is fatal to good singing. We must habitually fill our lungs thoroughly, and we must acquire perfect control over exhalation by means of the muscles of the ribs; that is, the emission must be the result of the collapse of the ribs, and the rate of collapse must be under control.

A correct method of breathing being once assured, little further trouble will be experienced in the production of pure tone. Fortunately, there is little difficulty in

acquiring control of the breath, if the following exercises are done regularly, so that the right method of breathing becomes a habit. They should be performed at the assembly of the school. Three minutes at every meeting spent upon these exercises will be ample time to devote to the subject, and the result will benefit the pupils physiologically as well as musically.

Inhalation.

Exercise I—The teacher counts *one, two,* during which the class slowly takes a full breath by expanding the lower ribs, not by raising the shoulders. This breath is retained without stiffening the throat while *three, four, five, six* are counted; then the breath is suddenly expelled. (To be repeated three times.)

Exercise II—The teacher counts *one, two,* as before, but after holding the breath for two more seconds the pupils endeavour to take in a little more breath, which is expelled after being retained for two or three more seconds. (Repeat three times.)

Exhalation.

Exercise I—Breath to be taken as in Ex. I above, but it is to be expelled very slowly immediately after the lungs have been filled. There will be a danger at first of the breath escaping rapidly; this must be checked by resisting the natural tendency of the ribs to collapse, not by closing the throat. (Repeat this exercise three times.)

Exercise II—Breath to be taken as before, but it is to be held for two seconds before expiration begins, and care must be taken lest at the *beginning* of expiration the breath is inordinately wasted.

Posture of Body.

It is obvious that a correct posture of the body during breathing exercises and vocal practice generally is of importance. The head must be comfortably poised on the shoulders, so that no rigidity of the muscles takes place. The root of the

tongue must not be stiffened, nor must it be humped so as to stop the free egress of tone from the larynx. The teeth should be kept well apart whilst emitting tone,[1] but the lower jaw must not be stiffened; in fact, a 'floating' jaw is one of the marks of a good vocalist. The position of the lips depends upon the vowel sung, but it may be remarked generally that English people do not make nearly enough use of the muscles of their lips. They forget that each vowel requires a distinctive position of the lips, which should be protruded for *oo* and drawn back for *ai*. To demonstrate this to the class, let the teacher tell the class to sing *oo, oh, aw, ah, ai, ee* on one note and to try to feel the different positions of the lips.

Quality of Tone.

Even although the breathing and bodily attitude may be correct, it is still possible to produce sounds of unpleasant quality. This will be the case if there is any forcing of the voice; that is, if any attempt be made to produce a note more loudly than is consistent with the stage of voice development reached. As a matter of experience it is found that nearly every child can produce tone of good quality provided it is *soft*; loud tones may or may not be pleasant, more often they are not. Hence the rule that class singing should normally be soft; in fact, *exercises* should invariably be sung quietly.

The voices of boys[2] are especially troublesome. The notes within their compass are produced in two different ways; the highest notes have a quality, and are produced

[1] Tone can be emitted upon vowels alone. When the teeth are closed to form dental consonants they should be opened again *immediately* for the following vowel.

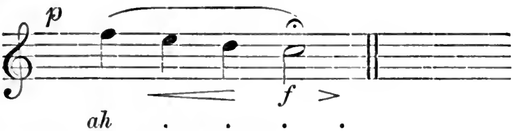
[2] Cases frequently occur where boys' voices 'break' before school life terminates. No boy in this condition should be allowed to take part in class-singing, or serious harm may result.

by a mechanism entirely different from that of the lowest notes. It so happens that the middle notes can be produced with either mechanism, and the general tendency is to produce them with the mechanism used for the lower notes, with the result that the higher in the scale the voice ascends the harsher and more strident the notes become. Technically, these two mechanisms are called the 'chest' (this is the ordinary speaking-voice) and the 'head' register. The great aim of every teacher of boys should be to secure that the middle notes are sung in the *head* and not in the chest voice. Scales sung downwards on the vowel '*oo*' have been found most effective for this purpose. The upper notes of the boy's voice are naturally of good quality, and the lowest are not unpleasant provided that an endeavour is made to get a full, round tone without the slightest suspicion of forcing.

In the case of girls the difference between chest and head register is not so marked. Generally speaking, the notes above F (first space, treble staff) should be sung in the head register. Children need not be told about the registers, but it is essential that they should be able to discriminate between harsh and pleasant tones.[1] It is a good plan to take one or two pupils who produce their voices correctly and to instruct the class to imitate the tone these produce as nearly as possible. If each individual member of the class be instructed to sing the same note in turn the others will at once appreciate the difference between tones of pleasing and unpleasing quality.

[1] The singer himself is not a good judge of the quality of the tone he produces. It is never the same to him as to his audience. To him the tone is modified by the resonance of the cavities of the skull and by the immediate contact of the sound with the seat of the perceptive faculty. A practised singer tries rather to *feel* the sound than to listen to it.

While soft singing should be the normal standard of tone, it is not at all impossible after diligent practice for a class to produce a good *forte.* The best way to attain this end is to sing such exercises as



The crescendo must be *gradual.*

It does not lie within the scope of this chapter to give a complete series of voice-training exercises; these will be found in any text-book of vocal music. They should at first be sung to the open vowels; then words containing these vowels should be employed.

It must be remembered that such exercises are tiring and seldom interesting, therefore they should be taken at the beginning of the lesson and should occupy only a very few minutes, for incidentally voice training goes on all through the music lesson.

Provided that the breathing exercises are practised at the opening of school, as recommended, the music lesson should open with the singing of a few isolated notes held steadily for several seconds. Then should follow some scales *legato*, and then an *arpeggio*, sung first *staccato* and then *legato.* This should take about five minutes, and another two or three minutes should be given to an exercise on wide skips to increase the flexibility of the voice. Some ingenuity should be expended by the teacher in devising variations on these exercises, bearing in mind what has been said upon the essentially uninteresting character of these studies.

The teacher should not forbear to give some commendation when the exercises are sung exceptionally well; it has

already been remarked that singers do not always know whether the tones they produce are as pleasant to the listener as they are to the performer.

Words in Singing.

10. In laying stress on the subject of quality of tone the teacher must not overlook the importance of securing distinct utterance of the words. The two points are by no means antagonistic; they are indeed complementary. The faults which produce bad enunciation of words will also cause bad tone. There is hardly a single vowel or combination of vowels in the English language with which a satisfactory tone cannot be combined. The vowels *ai* and *ee* are the most awkward to deal with, and a very slight modification of these obviates the difficulty. This question really belongs to the art of elocution and cannot be treated in detail here. Some points, however, stand out as pre-eminently important.

(*a*) All musical tone must be associated with a vowel sound—the true consonants are not, strictly speaking, sounds at all, but only the beginnings or cessations of sound in particular ways. Such semi-consonants as *s*, *sh*, *l*, and *r* must be remarked in this connection. These sounds must be momentary only—that is, we must get rid of them with the greatest possible celerity and proceed to the vowel following.

(*b*) Consonants must be very distinctly pronounced. It is rather the consonants than the vowels which define the word to the listener, especially if the word is associated with a long note.

(*c*) The whole word must be more clearly pronounced than in speaking, even to the point of appearing like exaggeration to the singer. The music tends to distract the attention from the words, hence these must be forced upon the hearer with extra emphasis.

(*d*) The English language is not phonetic; the spelling is no guide to the actual vowel sounds. For example, take the line—

"I mourn no more the vanished years."

The sounds upon which the music is made are *ah*+*ĭ*, *aw*, *óh*, *aw*, *ah*+*ĭ*, *ă*, *ĭ*, *ee*.

A very useful exercise is occasionally to take the words of one of the school songs, and make the class distil the true vowel sounds as exemplified above.

Reading from Musical Notes.

11. It has already been intimated that the accomplishment of reading from musical notes, although extremely valuable, must not monopolise the whole of the music lesson, although those responsible for framing many syllabuses seem to think that it should do so. Music existed before musical notation, and would still be a vital force in the world of Art were all systems of notation banished. Still, the reading of music is obviously of great importance, and the subject must be attacked and mastered during school life or it will never be comprehended at all.

Systems of Musical Notation.

The systems of musical notation are many, but two only are worth consideration: the 'Old Notation' and 'Tonic Sol-Fa.' There would be no profit in continuing here the long controversy which has been waged over their respective merits.

'Tonic Sol-Fa' up to a certain point is simplicity itself, and some excellent results have accrued from its adoption; on the other hand, it has not superseded the older system, and, if it is safe to prophesy, it probably will never do so. It is impracticable for instrumental music, and, considering that vocalists are so often instrumentalists as well, it is unreasonable to expect both systems to be learnt, although

by far the best results are obtained from the use of the Sol-Fa *principles* applied to the Old *Notation.*

The Old Notation bristles with anomalies due to the fact that it is the result of some centuries of growth; so does English spelling, which does not look as if it would be superseded just yet by a phonetic system.

Meanwhile, the teacher who wishes to equip his pupils most thoroughly for future musical life will probably adopt the combined system known as the 'Movable Doh,' availing himself of the excellent advice given in the many useful text-books issued by the Tonic Sol-Fa-ists, whose investigations into the subject of teaching vocal music are exhaustive, and, within their limits, trustworthy. Many experienced teachers find it best to use Sol-Fa entirely in the lower divisions, gradually combining the two systems later; others prefer to adopt the 'Movable Doh' at the very outset. It is not a matter upon which to dogmatise: both courses have their able advocates.

Difficulties of Notation.

Difficulties of notation fall broadly into two categories—difficulties of rhythm and difficulties of tune. These difficulties are dealt with *seriatim* by the authors of multitudinous good text-books, so that a few general remarks only will be offered here.

(*a*) A protest must be made against the unmusical puzzles which are too often proposed to children for solution. The so-called 'Time-tests,' much beloved by unimaginative teachers and even inspectors, bear about as much relation to music as they do to geometry. The best time-tests are those found by the teacher himself in the works of the great masters of music; there are thousands of such tests lying ready to hand.

(*b*) The same consideration applies to 'Tune-tests.' The aimless meanderings of some of the so-called melodies

set for tests in tune are devoid of anything approaching charm or even interest. Whereas, if the teacher takes some of the phrases from, say, Schubert's songs, the result will be pleasant and profitable. For modulator exercises nothing is better than a well-known tune; the desired link between sound and symbol is then already partly forged.

Conducting.

12. The personal demeanour of the teacher is, as everyone knows, a great factor in the success or failure of his teaching. In the music lesson there is a special instance of this. When the words and tune of a song have been mastered there is still something wanting to secure a good rendering. It may be called 'expression' or anything else; it is difficult to define.

A good soloist 'feels' his song, and by a selective use of the many 'tricks of the trade' which he has learnt by experience he contrives to arouse the same emotions in his audience. But no two singers 'feel' quite alike in this respect, and herein lies the difference between solo and class singing. In what we have called the 'recreative' songs individuality should not be repressed, but in the more important songs it is necessary to secure unanimity of sentiment. In fact, the sentiment infused should be the conductor's own; he plays upon the voices of his class, which he uses as one big responsive instrument. This he does, or, rather, should do, by suitable gestures; but good conducting is seldom seen in primary schools. A few remarks may be useful:

(*a*) Every gesture should *mean* something; mere posturing is ludicrous and useless.

(*b*) The same gesture should always indicate the same desire.

(*c*) The gestures should be clearly seen by the class, but as far as possible screened from everyone else.

(*d*) The gestures should be graceful. If a teacher were

occasionally to practise these gestures before a mirror he would possibly be saved from making himself ridiculous in public. Few realise how absurd some of their bodily postures are until they have seen them as others do.

(*e*) The class must be immediately responsive to the slightest indication on the part of the conductor. To keep the class on the alert the teacher should occasionally vary the rendering of a song.

(*f*) Conducting should enhance the rendering—if it does not, it is superfluous.

Teaching from Notes.

13. In teaching a new song from notes, the class will have a copy of the music and words, or these may be written on the blackboard. The rhythm will be attacked first, any difficult groups being isolated and analysed. Incidentally it may be remarked that the French time-names employed in the Tonic Sol-Fa system should invariably be used, whether that system be adopted in its entirety or not. There is no doubt as to their excellence. Next, any difficult melodic intervals will be isolated and sung from the modulator. Then the tune itself will be pointed with its proper rhythm on the modulator and sung to the notes, phrase by phrase. The next step is to have the tune sung from the copy, using such syllables as *loo*, *lah*, etc.

The words will then be studied, being slowly read aloud three or four times. The music and words will then be conjoined, no notice being taken at this stage of expression marks. These will be observed when all other difficulties have been surmounted.

Conduct of the Music Lesson.

14. The music lesson is perhaps the one opportunity for relaxing, in a certain sense, the rigid bonds of discipline. Of course, during the period devoted to modulator and other exercises the ordinary strict discipline must be maintained, but in that

part of the lesson given up to songs a little more 'free and easy' atmosphere may prevail. The pupils may be encouraged to choose their own songs and to offer suggestions for their better rendering; generally speaking, the teacher and children may co-operate on more equal terms than is desirable at other times.

Visits to Concerts.

15. In these days of school visits to museums, a plea might be entered for an occasional visit of a music class to a good concert. School children as a rule seldom get the opportunity of hearing better music than they themselves produce; hence they have no standard of excellence by which they can measure their own performance. If a teacher is fortunate enough to be able to arrange for such a visit, he should give his class beforehand a preliminary explanation of the chief features of the programme, otherwise the unfamiliarity of the whole performance will engender a feeling of wonderment rather than one of unalloyed pleasure.

School Course in Music.

16. We will conclude by giving the outline of a suitable course in music for the primary school. This course assumes that the 'Movable Doh' system is adopted. It will also serve, *mutatis mutandis*, if either the Staff or the Sol-Fa system be exclusively adhered to.

First Year's Course.

First Year.

(i) Breathing exercises.[1]

(ii) The notes of the major scale to be taken consecutively and then in short phrases: *i.e.* the scale $d\ r\ m\ f\ s\ l\ t\ d^1$ is first to be learnt by ear, then shown on the modulator. Then short phrases such as $d\ r\ m$, $s\ l\ t\ d^1$, are to be taken, upwards and downwards. No skips to be taken at this stage.

[1] *See* pp. 203-5.

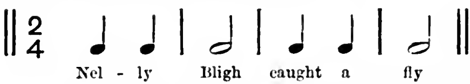
(iii) Ear exercises founded on the above.

(iv) The notes of the common chord *d m s d*' to be learnt after the work indicated in (ii) has been mastered. This chord should be taught thus: *d r m, d m* (several times); then *d r m f s, d s*; and so on.

Some teachers make the mistake of taking this chord before the notes of the scale; this is wrong, because nearly every child will have heard the scale frequently outside the school, whereas the *arpeggio* is not likely to be at all familiar. The exercises should be varied as far as possible, and rhythm introduced into them as soon as opportunity offers. Monotony in the exercises is more difficult to guard against at this stage than at any time.

(v) Ear exercises founded on this chord.

(vi) Simple rhythms of two or three-pulse measure $\left(\frac{2}{4} \text{ or } \frac{3}{4} \text{ time}\right)$ not containing subdivided beats. The class should invariably beat time while singing these rhythms and the first beat of every bar should be strongly accented. The exercises should at first be sung to the time-names, afterwards to one syllable as *doh*. Occasionally short sentences may be fitted to the rhythms, *e.g.*



Every rhythm when learnt should be clothed with a simple melodic outline.

(vii) Meaning of the terms *p, f, mf.*

(viii) *Songs.*—In the first and second years these should be learnt by ear, but there is no reason why the easier phrases should not be analysed by the class and used as ear or modulator tests. The songs chosen should be of simple melodic and rhythmic outline and of moderate

compass. The words should be selected with care, regard being paid to the limited comprehension of children of this age. Nursery rhymes are excellent for the purpose: musically, the old tunes are of a high order of merit, and do not require an accompaniment. Moreover, they form excellent melodies for use during musical drill. There is nothing better than musical drill to foster a sense of rhythm. Action songs are also commendable.

SECOND YEAR'S COURSE.

Second Year.

Many of the remarks made upon the first year's course are applicable here—*e.g.* it will be assumed that breathing exercises will be continued throughout the whole period of the child's school life.

(i) The Major Scale, including easy intervals of a third, and leaps to the key-note from any other note of the scale. These intervals should be taught by the same method as that suggested above. Thus, $d\ r\ m\ f;\ d\ \widehat{f}$. The compass may be increased so as to include $l_{|}$ and $m^{|}$.

(ii) Ear exercises as before.

(iii) Rhythmic exercises as in the first year's course, but including $\frac{4}{4}$ time and containing sub-divisions of either of the unaccented beats into halves, and introducing rests of one beat. Also simple rhythms are to be written down when sung by the teacher. This dictation of rhythms to be continued in the third and subsequent years' courses.

(iv) Meaning of such terms as *rall.*, *cresc.*, *dim.*, etc.

(v) Unison songs, still of a simple character and learnt by ear.

(vi) Simple three-part rounds, if the class finds no especial difficulty therein; otherwise these can be postponed until the third year.

Third Year's Course.

Third Year.

(i) Major scales beginning on a high or low key-note. Introduction of *fe* and *ta*. More difficult intervals.

(ii) Ear exercises on the above.

(iii) Simple two-part harmonies founded on the common chord of the tonic.

(iv) Rhythmic exercises comprising more difficult variations of the exercises included in the previous year's course, and introducing rests of two beats' duration, tied notes, and the rhythm ♩. ♪ (*taa-aatai*), which should be taught through these stages, ♩ ♫, then ♩‿♫, and finally ♩. ♪. Pupils should be asked to invent rhythm for themselves.

(v) Meaning of a few more technical terms.

(vi) Unison songs, the simplest of which should be learnt from the notes. The *répertoire* should be more extensive in this and subsequent years.

(vii) Rounds in three parts.

Fourth Year's Course.

Fourth Year.

(i) Introduction into the major scale of *se* and *re* through the phrases *l se l* and *m re m*.
The melodic minor scale in simple phrases.
Modulation into the first sharp key.

(ii) Ear tests founded on the above.

(iii) Simple harmonic exercises in three parts, founded on the common chords. Each chord to be sung separately and considerably prolonged.

(iv) The rhythmic work of the preceding years with the adddition of $\frac{3}{8}$ time. Division of the unaccented beats of $\frac{2}{4}$, $\frac{3}{4}$, or $\frac{4}{4}$ time into thirds (*taa-tai-tee*). The rhythms should not invariably begin on the first beat of a bar.

(v) Extension of vocabulary of technical terms.

(vi) Several unison songs to be learnt as recreation, also a detailed study made of one or two songs of a more complex character in two parts.

(vii) Rounds in three parts.

Fifth Year's Course.

Fifth Year.

(i) Introduction of the remaining notes of the chromatic scale. More difficult passages in the minor mode. Leaps to—not from—chromatically altered notes of the major scale. Modulation into the first sharp or flat remove.

(ii) Ear tests founded on the above.

(iii) More extended harmonic exercises in three parts founded on the common chords. A succession of these chords to be made into a short phrase.

(iv) Rhythmic exercises as in previous years, with the addition of $\frac{6}{8}$ time, which should at first be sung slowly with six beats in a bar, afterwards as compound time (two beats in a bar). The division of a beat into quarters, also into $\frac{1}{2} + \frac{1}{4} + \frac{1}{4}$ and $\frac{3}{4} + \frac{1}{4}$. Rests of the duration of a half-beat.

The exercises should be now more extended, say to eight bars, and many excellent examples can be found in the simpler instrumental works of the great Masters. The melodies in each case should be played or sung after the rhythms have been learnt.

(v) *Songs.* Books of words such as *Gaudeamus*[1] should be provided and a liberal selection made. The tune can be written on the blackboard and learnt therefrom, without making any detailed analysis. For more careful study, three or four good classical songs in two parts can be taken.

(vi) Rounds in three parts.

Sixth Year's Course.

Sixth Year.

(i) A revision of the melodic work of preceding years, also the harmonic form (*f se l*) of the minor scale. The reading of simple tunes—melody and rhythm—at first sight.

(ii) Ear tests as before, and recognition of the intervals of the perfect fifth and octave, and of the third and sixth when both notes are sounded together.

(iii) Harmonic exercises as in the fifth year, but with phrases more extended.

(iv) $\frac{4}{8}$ and $\frac{9}{8}$ time; also $\frac{2}{2}$, $\frac{3}{2}$ and $\frac{4}{2}$. The pupils can be encouraged to invent simple melodies to the given rhythms, always beginning and ending on the key note, and avoiding a succession of large skips. More difficult rhythms from classical works. The connection between poetical metre and musical rhythm to be shown and the class invited to invent rhythms corresponding to given poetical metres. Two-part varied rhythms sung by the divided class to $\left.\begin{matrix} s \\ m \end{matrix}\right\}$ or $\left.\begin{matrix} m \\ d \end{matrix}\right\}$. The writing of rhythms of well-known tunes.

(v) The meaning of other technical terms.

(vi) Rounds in three and four parts.

[1] Published by Cassell and Co.

(vii) A demonstration of the construction of the piano and the principles underlying it.

(viii) More songs from *Gaudeamus*, with one or two classical two-part songs.

SEVENTH YEAR'S COURSE.

Seventh Year.

(i) Reading exercises as before, with easy examples in two parts to be sung at first sight.

(ii) Writing down, first in rhythm and then completely, the melody of any well-known tune. The three chief chords of the scale to be recognised when played. Writing down a short simple melodic phrase as dictated.

(iii) Harmonic exercises as before, but inclusive of four-part chords, which must be chosen with due regard to compass.

(iv) $\frac{12}{8}$ and $\frac{6}{4}$ time and examples of varied rhythms from classical works. Three-part mixed rhythms sung to $\left.\begin{matrix} s \\ m \\ d \end{matrix}\right\}$. Rests of less than a half-beat, and more intricate sub-divisions of a beat.

(v) Meaning of the remaining technical terms in common use, especially of the 'Sequence.'

(vi) Some acquaintance can be made with folk-songs of the British Isles. Two-part and perhaps three-part songs for study from Mendelssohn, Rubenstein, and other classical composers. There should now be one or two pupils capable of singing a solo in the 'recreative' songs; variety can be thus ensured by adopting the principle of solò and chorus.

(vii) Rounds in three and four parts.

(viii) One or two object lessons on the violin and the human voice.

The following books are recommended to the teacher :—

On the Teaching of Music :

Bates : The Child's Voice	2/-	(Novello).
Curwen : The Boy's Voice	2/6	(Curwen).
Hardy : Children's Voices	1/-	(Curwen).
Behnke : The Human Voice... ... ... [A physiological work.]	1/6	(Curwen).
Hulbert : Breathing for Voice Production	2/-	(Novello).
Curwen : Companion for Teachers	1/-	(Curwen).
Birch : The Voice Trainer	1/-	(Curwen).
Richardson : Choir Training	2/-	(Vincent).
White : Hints to Singers	3d.	(Vincent).
Marshall : Five Minutes' Exercises ...	6d.	(Vincent).
Curwen : How to Read Music	1/6	(Curwen).
Somervell : Fifty Steps in Sight Singing ...	2/-	(Curwen).
Shinn : Elementary Ear Training	2/-	(Vincent).
Board of Education Suggestions : pp. 70-73 ; 127-135	8d.	(Wyman).

Collections of School Music[1] *:*

Stainer : School Round Book	8d.	(Novello).
Stanford : National Song Book ... ... [Edition with Words and Voice Parts only, 1/-.]	3/-	(Boosey).
Sawyer : Graded School Song Book ...	2/-	(Vincent).
Nicholson : British Songs for British Boys [Edition for Pupils, 1/6 ; Words only, 6d.]	6/-	(Macmillan).
Baring-Gould and Sharp : English Folk Songs for Schools	2/6	(Curwen).
Hadon : Songs of the British Islands ...	2/6	(Curwen).
Moffat and Kidson : Children's Songs of Long Ago	2/-	(Augener).
Brahms : Nursery Songs ... ... [Unison : for Junior Classes.]	6d.	(Novello).
Cornelius : Six Christmas Songs ... ... [Unison : for Senior Classes : accompaniment indispensable.]	6d.	(Novello).

Teachers are advised to subscribe to the *School Music Teacher* and *The Musical Herald*

---

[1] This is but a small selection from the available sources of supply.

CHAPTER X.

THE TEACHING OF HISTORY.

State of History Teaching in England.

1. In 1899 a Committee appointed by the American Historical Association to investigate the study of history in schools reported that in England "the most noticeable features are a lack of historical instruction, a common failure to recognise the value of history, and a certain incoherence and general confusion." These strictures were only too well deserved. In the great public schools the introduction of history as a definite subject of instruction only dates from Dr. Arnold's rule at Rugby (1828-1842). In the primary schools history was practically unknown before 1875, though here and there a school had, during the previous eight years, taken it, as a 'specific' subject, with a few chosen pupils. In 1875 history was made one of the optional 'class' subjects, on only two of which grants could be earned; but it was the least favoured among those subjects. In 1899 the official returns show that even of schools taking such subjects only about 25 per cent. took history, whilst 95 per cent. chose object lessons, 75 per cent. geography, and 60 per cent. grammar. In the following year history was included in the subjects commonly to be taught in primary schools.

Equipment of the Teacher.

2. This historical sketch makes it plain that there is much less tradition about the teaching of history than there is about the teaching of most of the other subjects included in the course of study of the primary school. This has both its

good and its bad sides. On the one hand, teachers are not habituated to mechanical methods; but, on the other hand, many teachers are not well qualified by their previous study and training to teach a subject requiring much special knowledge. In France and Germany history is taught by teachers who have been specially prepared for the work, and it would be well if this plan were adopted in England. Still, history is not a subject requiring such special natural gifts as do music and drawing. In it, indeed, almost every teacher who makes a serious effort may become reasonably proficient. The effort, moreover, brings its own reward, for real history has an intrinsic attraction for intelligent minds. It is because many teachers know history only in the guise of an inferior school text-book that the subject has no attraction for them, and consequently is abhorred by their pupils. For in history, even more than in most subjects, the first essential is a well prepared and stimulating teacher. It is not encyclopaedic knowledge that is required, but a sure and intelligent grasp of, and an insight into, the meaning of great movements, and enough knowledge of detail to be able to make those movements real to the imagination both of himself and of his pupils. In the next place, sanity and impartiality of judgment are essentials, the result of practice in weighing evidence and comparing authorities. Add to this the power of raising interest and enthusiasm by striking and vivid narrative and skilful questioning, and finally, such a knowledge of books and of the best ways of using them as will enable him to train his pupils in profitable reading for themselves.

As the last two powers are general requirements for fruitful school work, it will be sufficient if we say a few words on the first two, which are more specifically connected with history. The teacher, then, who knows little

history cannot prepare for his history teaching all at once. He must read real books, and such reading takes time. So he will attempt at first to make himself proficient in a few topics, and will increase the number year by year.

After assimilating a good general history of Europe, and such an account of the history of his own country as is contained in Green's *Short History of the English People*, he should undertake the intensive study of some one period, selecting that which most appeals to him. On this he should read the best book that has been written, a book which is at once history and literature. When this has been mastered he should study other writers who deal with the same movement from other standpoints, and compare and weigh the more or less differing opinions. Thus he will learn that real history is not a mere record of events, but an insight which pierces through the facts to the spiritual forces which alone give them significance, and that the teaching of history implies a power of leading others to share in this insight. He should then read at least one good book on every period he is going to teach. Wherever it is possible, the teacher of history should attempt some piece of independent work, to bring home to him more clearly what history really means and how historical knowledge is developed. Most profitably may he work out some points of local history, which will always give colour and interest to his teaching. To focus the results of his study he will do well to write careful digests in a series of note-books.

By such a course of study a teacher will fit himself by knowledge to teach history and will have done much to train his own judgment. But not all the knowledge he acquires will be of direct service in his teaching. No educational heresy is more deadly than that the teacher need know only the same things, or the same kind of things,

that he teaches. The true teacher must know much that he does not teach; only so can be wisely select what to teach, and having selected it, make it live in the minds of his pupils. As he gets a living idea of a topic, he will select what he shall teach about that topic. He will do well to write full and well arranged outlines of the matter he chooses, on the right-hand pages of a manuscript book, giving exact references to the books from which it is drawn. On the left-hand pages he should add from time to time notes suggested both by further reading and by the actual giving of the lessons. In all subjects this plan is helpful and is some safeguard against a yearly deterioration of a set of lessons from living forces to dead and dry forms. But in no subject is it more important than in history, where the first preparation of every good lesson is a work occupying considerable time.

We have put this consideration of the essential qualifications of a teacher of history in the foreground of our discussion because, unless they are secured, the teaching of the subject cannot be really successful. It is often said that children dislike history, and, indeed, they would be either more or less than human if they did not dislike what too often goes under its name in schools. But when taught by a sympathetic and competent teacher history is always popular with the pupils. The fault is never in the subject, but always in the teacher. All children like to hear stories about the deeds of other human beings, and after the first few years of life they prefer true stories to fiction. Moreover, they are deeply interested in learning how things came to be what they are. In no subject, indeed, is it more possible to rouse a living interest that will persist long after school-days are over, and so continue not only to be a means for the rational employment of leisure, but an enduring formative influence on thought and life.

Function of the Study of History.

3. What function, then, should the study of history fulfil in life? History is said by Stubbs to be "the knowledge of the adventures, the development, the changeful career, the varied growths, the ambitions, aspirations, and, if you like, the approximating destinies of mankind."[1] The result of the study of the great world movements of the past should be to give an insight which cannot otherwise be attained into the conditions of society at the present. Thus, the study of history should help the individual to understand the human world in which he lives so far as it is organised into states and smaller, but in some respects similar, corporations. But of this world the individual forms a constituent part, and he is what he is through his relations to the rest of society. Hence, in understanding society he understands himself more fully, and gains increased power of directing his own life. In other words his power of judging wisely in the actual situations of life is trained, and at the same time made surer, by the clearer apprehension of the meaning of the facts on which it is to be exercised. So Stubbs tells us: "If the study of history can really be made an educational implement in schools, it will raise up a generation who not only will know how to vote, but will bring a judgment, prepared, trained, and in its own sphere exercised and developed, to help them in all the great affairs of life."[2]

Of course, mere knowledge of past events will not do this. History must be made a reality, a study of the actions and motives of real men and women and of real human societies. And it must be brought up to our own time if the pupils are to feel that "in modern history . . . your field of examination is the living, working, thinking, growing world of

[1] *Lectures on Mediaeval and Modern History*, p. 85.

[2] *Op. cit.*, pp. 130-1.

to-day. . . . Modern history is the history of ourselves, of the way in which we came to be what we are, of the education of our nation, of the development of our government, of the fortunes of our fathers, that caused us to be taught and governed and placed as we are, and formed our minds and habits by that teaching, government, and position."[1] When a living knowledge of the origin and mode of growth of institutions is thus attained, the student has at least one essential requisite for forming a judgment as to the kind of change that is desirable, and has some qualification for estimating the probable consequences of proposed lines of policy. For to change an institution wisely demands a knowledge of its nature, the roots of which are in the past, and which has gradually changed and developed to its present form with the lapse of time.

It is seen, then, that the study of history should serve the very practical end of developing both knowledge and judgment in the conduct of social and public life—no small thing in a democratic State. It thus has both an ethical and a patriotic influence. But the direct purpose of the teacher should not be to inculcate either private morals or patriotism, for to do either with effect frequently demands a distortion of the facts, and the very first moral lesson derived from history should be a love of truth. "I think," says Dr. Stubbs, "that there are few lessons more necessary for men to learn, not merely who are going to take to public life, but who are going to live and move as men among their fellows, than these:—that there are few questions on which as much may not be said on one side as on the other: that there are none at all on which all the good are on one side, all the bad on the other, or all the wise on one and all the fools on the other: . . . to learn that simple assertion however reiterated can never make proof: . . .

[1] Stubbs, *op. cit.*, pp 16, 18.

above all, that no material success, no energy of development, no eventual progress or consolidation, can atone for the mischief done by one act of falsehood, treachery or cruelty."[1]

Moral judgments are most effectively and easily passed on the conduct of individuals, and this is most surely examined in fiction or in biography. In history we are interested in individuals only so far as they express or influence their age; the real objects of our study are not individual lives, but the general tendencies of life, and the ideas which find expression in world movements. In these the individual, leader though he may be, is typical and representative, and not infrequently sees but imperfectly the tendency of his own actions. The judgment of posterity on the value of great movements to the life of the world or of the nation is frequently different from that of the actors in those movements. Hence it is that "history is very impatient of direct morals. Its teaching is to be found in large tendencies."[2]

But it is often urged, especially in Germany, that if the function of the teaching of history is not directly to inculcate moral lessons, it should, nevertheless, definitely address itself to the development of patriotism. But when this is made the direct aim there is great danger lest the patriotism be of that spurious type which consists in upholding as right and just all the native country has done in the past or is proposing to do in the present, and which manifests itself mainly in shouting and in other forms of publicly advertising the feelings. There has been much to be regretted in the past history of every nation, and true patriotism does not consist in ignoring this, or in distorting the facts so as to make the worse appear the better cause, but in

[1] *Op. cit.*, p. 20.

[2] Creighton, *Historical Lectures and Addresses*, p. 264.

endeavouring to discover the noblest ideas which have been operative in the national life and to promote the future dominance of such ideas. The true patriot is he who does his duty manfully in both the public and the private relations of life, not he who most persistently blows the trumpet of self-glorification or beats the drum of ostentatious advertisement.

That the study of such a past history as that of our own country will tend to develop this true patriotism is doubtless true, for, as Lord Avebury says: "If ever there was a country for which a man might work with pride, surely it is our own.... In our history there has, no doubt, been much to regret. But yet, as contrasted with that of other nations, it has been comparatively bloodless.... When, indeed, we look back on the whole history of the past, it is not, I think, too much to say that our country has exercised its great trust in a wise and liberal spirit."[1] That such a true patriotism—a love of country which is not a mere foolish partiality, blind to all faults in its idol, but a rational recognition that, on the whole, the good elements predominate and that it is the part of all true citizens to help to right the wrongs in national life, not to deny their existence—is worthy of cultivation all must acknowledge. It is based on justice, not on narrow prejudice; it recognises the rights of other nations, and may impel a man to resist a general popular movement when he believes it to be repugnant to the highest ideals and best interests of his country. Such a true patriotism can only be the outcome of a study of history which aims solely at reaching the truth about events, of understanding the tendencies of which those events were signs, and of estimating the value of those tendencies. "The real imperial spirit," says Lord

[1] *The Use of Life*, Chap. X.

Avebury, "is not one of vainglory, but of just pride in the extension of our language and literature; of our people, and our commerce, on land and sea; and a deep sense of the great responsibility thus imposed upon us."[1]

We agree, then, with MM. Langlois and Seignobos when they write: "We no longer go to history for lessons in morals, nor for good examples of conduct, nor yet for dramatic or picturesque scenes. We understand that for all these purposes legend would be preferable to history, for it presents a chain of causes and effects more in accordance with our ideas of justice, more perfect and heroic characters, finer and more affecting scenes. Nor do we seek to use history, as is done in Germany, for the purpose of promoting patriotism and loyalty; we feel that it would be illogical for different persons to draw opposite conclusions from the same science according to their country or party; it would be an invitation to every people to mutilate, if not to alter, history in the direction of its preferences. We understand that the value of every science consists in its being true, and we ask from history truth and nothing more."[2]

But though we seek directly neither to teach morals nor to inculcate patriotism, yet we may look, as has been shown, for an effect on life in the direction both of morality and of patriotism. The point is that such an effect should come as an indirect result, that it should not, by being made the dominating purpose, decide what shall be taught and the light in which it shall be presented.

The whole discussion may be summed up in the words of M. Lavisse, simply substituting 'England' and 'Englishman' for 'France' and 'Frenchman.' He says: "To give the pupil an exact idea of the successive civilisations

[1] *Ibid.*

[2] *Introduction to the Study of History*, Eng. trans., p. 331.

of the world and definite knowledge of the formation and growth of France; to show him the action of the world on our country and of our country on the world; to teach him to render to all peoples their just dues, to widen the horizon of his mind, and finally to leave him in possession not only of an understanding of the present condition of his country and of the world, but also of a clear notion of his duties as a Frenchman and as a man—such is the function of history in education."[1]

Place of History in the Primary School.

4. To grasp the true nature of history and the influence it exercises on life is to recognise that its study requires a certain development both of experience and of mental power. Into the deeper and broader problems of history, indeed, the primary school can at no time pretend to enter. But it should treat the history it does teach in such a way as to form a permanent tendency to pursue the study on the lines we have indicated. This planting and early nurture of a genuine interest in history, and not the memorising of numerous statements of fact, is the true aim of the teaching. But this treatment cannot profitably be begun until the pupil is sufficiently mature to have some power of estimating the lapse of time, a fair general knowledge of the meaning of geography, and a sufficiency of the kind of material which he must re-arrange in his imagination in order that the past may be a living reality to him and not a mere set of empty phrases. Such maturity is not reached before about the twelfth year of age. Consequently, the real study of history will not begin before the fifth year in the senior school. In the earlier years the teacher should simply attempt to prepare the way by broadening the outlook of the children on life

[1] *A propos de nos écoles*, p. 81.

through story growing more and more of the nature of history.

Preparatory Course.

5. During the first two years of school life this work will be merged in literature, which amongst its material will include myth and legend culled from all countries and all tribes, and largely chosen on the basis of clearness of revelation of the life of motive and the results of simple virtues and vices. Such stories exercise the children's fancy, and at the same time furnish the simplest material for the general attempts of the young mind to find a connection in life. The lesson for life should not be elaborated or insisted on; it should be felt rather than formulated, though a spontaneous expression of the feeling need not be checked. There will be no attempt at locating in time more definite than the familiar "Once upon a time."

Guiding Principles of Selection.

In the third school year the preparation for real history should gradually become more definite. The object is rather to create a taste for history than to give historical knowledge, for unless such a taste be developed all future efforts will be profitless. But at the same time it must be remembered that the taste wanted is not a mere desire to be amused and entertained by striking and attractive stories, but a living curiosity to know more of persons of whom something has already been learnt, and of events in which they were prominent actors. Thus, the selection of stories should not be determined primarily by the children's immediate likings, though the teacher will reject any that will not appeal to their imagination and sympathy. As Dr. Oppenheim remarks: "There is, as a rule, but little reliance to be put upon a child's natural taste. There is no more reason why he should know what is best for his intellectual welfare than that he should spontaneously

recognise what is his most advantageous food."[1] It is the teacher's function to develop and train interests in relation to purposes, not to pander to childish caprices which lead nowhere beyond themselves. To interest a child in his studies is every good teacher's aim, but that is a very different thing from allowing the child's various likings to decide what he shall learn. The latter, indeed, is the surest way of securing that the child will grow up with no stable interests and no serious purposes. We try to create in him a taste for history because we recognise the valuable effect well-studied history may have on his life, not because he likes to hear tales, though this natural liking gives us our starting-point with him.

The preparation for history, then, should begin with stories, because the young child can be interested in stories but cannot be interested in real history, for that he cannot understand. But the selection of stories should be determined by a consideration of the course in history he is to study in his later school years. The stories should aim at making the pupils familiar with the greatest names they will meet with in that course, and at giving them general ideas of the great deeds with which those names are associated and of the time and place in which those deeds were wrought. It is not biography in the proper sense of the term—for biography treats of the whole life of its subject—so much as a vivid personal element in the story of great events. Only those biographical details should be given which bring out the relation of the hero to the events in which he played a part. It should be remembered that the teaching in this preparatory course is anticipatory of that which is to follow, and, consequently, the historical aspect must always be emphasised. And for history, as has been already pointed out, individuals are important

[1] *The Development of the Child*, pp. 104-5.

just in so far as they represent movements of national or of general human life.

As the pupils pass through the fourth year the relations of events in time and place will be more and more emphasised. But still the teaching will be essentially the vivid narration of great and stirring events, though, as the pupils advance in power of imagination and thought, the personal element in those events may become less dominant than in the earlier stories. The course may be likened to beads of history of various size and brilliancy strung on a thin string of time connection; but the string increases in thickness and the beads are more obviously held together by it as the course advances towards its end.

The selection of stories should, then, be determined by the course of history which is planned for the fifth and following years of school life. The preparatory course should develop a living organ of learning—a kind of nervous system of historical knowledge consisting of nuclei of fuller apprehension of important persons and events connected by thin fibres of general time and place relations.

An Outline Course.

Assuming that the later course follows the general lines laid down in the next section, the centres of instruction will be drawn from Greek, Roman, and general later European history, though special prominence will be given to English topics.

The stirring stories of Thermopylæ and Salamis with their glowing lessons in true patriotism and undaunted bravery, such heroes of old Greek life as Solon, Leonidas, Themistocles, and Pericles, set in pictures of daily life in the Greece of their day, the expeditions and victories of Alexander, will furnish delightful instruction to children even as young as those just entering on their third school year, for the life is simple and the human qualities

emphasised are elementary and such as they can enter into with sympathy.

Then the drama shifts to Rome, and they hear the stories of such heroes as Horatius and Cincinnatus, of Hannibal and Scipio, of Caesar and Brutus. They will see Rome becoming Christian, will trace her civilising presence in our own land, and learn about Boadicea and Caractacus, Gregory the Great and Augustine.

Having admired and wondered at Rome in her greatness they will watch her fall, hearing of Alaric and Attila and the barbarians they led. This will lead to stories of the settlement of the English in England, and they will become familiar with Egbert and Alfred. They will compare Alfred with Charlemagne, and contrast the blessings of settled government under them with the anarchy which preceded them. They will watch the settlements of the Normans in Gaul and of the Danes in England, and will become familiar with Rollo and Canute.

Then they will see England connected with the Continent under William, and they will hear of the fateful battle of Hastings.

The stories in the next place will be designed to give some idea of the two great factors in mediaeval life—the Church and Feudalism. The pupils will be told of Anselm, Thomas of Canterbury, William of Wykeham, of monasteries and friars, of the building of churches and the founding of schools. On the other hand they will hear of life in castle and camp, of wars between nobles, between king and nobles, or between kings and kings, each centred round such typical figures as Stephen, John, Edward the First, Wallace, Bruce, the Black Prince, Henry the Fifth. They will be taught about Mahomet and the spread of Mahometanism, to prepare them to go on the Crusades with Godfrey of Bouillon and Richard the Lion-hearted,

and to understand something of the civilisation of the East, of which Saladin may be taken as the type. In Wat Tyler they will see another and a darker side of Feudalism.

In preparation for the disruption of the mediaeval organisation of society they should hear of Caxton and early printing, and of the great discoverers—Columbus, Vasco da Gama, Cabot, Balboa, and Magellan, and should follow them in their venturous and hazardous voyages, tracing their courses on the map. They should go with Cortez to Mexico and with Pizarro to Peru, they should sail the Spanish Main with Drake and Raleigh. But little should be told them about religious disputes, but they must hear something of Wycliffe, Luther, Mary, and Philip the Second of Spain. Then they will be ready to fight with the English in the Armada, and to enter into the outburst of national life in the time of Elizabeth.

They will next learn of the Pilgrim Fathers and of the struggle in England for civil and religious liberty, hearing of Charles the First and Cromwell. Something, too, they may well know of France and Louis the Fourteenth.

In Clive and Wolfe they will see typified the growth of the English Empire, whilst Washington represents the heaviest blow that Empire has ever received and the birth of a sister English-speaking State. They will watch the great death struggle centred round the heroic figures of Napoleon, Nelson, and Wellington.

In the quieter walks of peace they will learn of the great inventions of the last century and a half, grouping them round Watt and Stephenson; they will follow the progress of geographical discovery with Cook, Franklin, and Livingstone; they will share Wilberforce's struggle for the abolition of slavery, and hear something of the same movement on the other side of the Atlantic.

The general movements of the last century are, however, too complicated to be understood by children of this age, and the matter appeals but faintly to their imagination and sympathies. Less direct preparation will, therefore, be given for the later study of this period than for that of earlier times.

Form of Teaching.

Such a scheme of work is only put forward as a suggestion and in illustration of the principles which have been laid down. But when some such course is followed by a teacher who is really competent in knowledge and stimulating power the children at the end of their fourth year are both ready and anxious to enter upon the more serious work of the next course.

The teaching must, of course, be oral, though some illustrative reading may be done both by teacher and class. The narrative must be made vivid by details which set in relief the main points and by pictures illustrating in a striking way the events narrated. Dr. Arnold, indeed, recommended that the earliest lessons should be based on striking and suggestive pictures. These should be in colour, and should not be glaringly inaccurate in the accessories of dress and surroundings, nor offensive by their want of artistic quality. But the main thing is that they should arrest attention and excite curiosity, and this stimulating power must not be sacrificed either for archæological precision or for artistic effect.

Poetry which bears on any of the topics should be freely quoted, read, copied out by the children, and, if it appeals strongly to them, learnt by heart. Reading books which illustrate past modes of life—such as Mr. Finnemore's *Boys and Girls of Other Days*[1]—should be read. But no attempt should be made at this stage to

[1] Published by Messrs. A. and C. Black.

teach history from books or, indeed, to read books which are histories in the ordinary sense of the term. The real teaching is by means of oral lessons, and to that all else is subsidiary.

The historical stories are, however, not merely to be listened to, but to be apprehended and remembered. The teacher should, therefore, revise regularly and thoroughly, taking care that such revisions are never degraded into bald exercises in verbal memory. Let him call upon individual children to reproduce orally the whole or part of a story, to answer questions, to compare one story or set of events with another. Let him set topics for written exercises, encouraging the children to illustrate one story by another, and let him carefully go through these written exercises with his class. Thus history, literature, and language teaching are made to illustrate and help each other, and it will be found that two lessons a week will be sufficient to give to the telling of historical stories.

Selection of Matter in History.

6. When we turn to the course in real history for the upper classes we are obviously met by the difficulty of selection of matter. For the number of facts is practically infinite, and the field is inexhaustible. Happily, most of the facts, in history as in all other subjects, are in themselves worthless. The only facts we want are those which give us power, those we can use. And in history this means the facts which bring home to us, and help us to realise, the great movements of the past.

Scope.

It is commonly held that in the primary school the teaching must be limited to English history. Against this view we would urge that when history is thus restricted, the English history itself becomes largely unintelligible. As well might one try to give

a comprehensible account of a man's life by ignoring his surroundings. How can such a life be understood if we know nothing of the people or circumstances which influence him, with which he strives, through relation to which he is what he is? And it is the same with the life story of a nation. Like the individual its life takes its filling and its meaning from its relations with the rest of mankind.

What understanding can one who knows nothing of the Catholic Church have of England in the Middle Ages? What meaning can be found in the wars with France or Scotland by one who is ignorant of feudal institutions? And both the Church and Feudalism bound civilised Europe into one organic whole. In later times who can find a clue to the wars which fill so much of the seventeenth and eighteenth centuries when his outlook is bounded by the confines of his own country? And let us remember that the unintelligible is devoid of interest. May not much of the want of success in exciting the pupils' interest which is so often and so truly charged against the teaching of history in English schools be due to this very limitation? We firmly believe that it is so. With all the great masters of history, then, we would urge that this restriction be not attempted. True it is that the emphasis will be laid on our own country, that we shall, indeed, teach the history of other lands mainly with the view of making that of our own land intelligible, but this intelligibility is not to be attained by mere isolated and incidental references to the course of national life outside our own land.

Further, everything which limits one's outlook to one's own country tends to promote insularity and that false patriotism of which we have spoken. We do not think of abstaining from teaching the geography of countries other than our own, and yet that outside geography is not so essential to the understanding of the

geography of Engl ınd as is the history of other nations to the understanding of the history of England. Under geography is taught much of the present relations of England with other lands, but those relations only become intelligible when their development has been traced.

But, it will be urged, you thus make the difficulty of selecting the matter of instruction immeasurably greater. We reply that the difficulty is largely due to a misapprehension. The common opinion is that school history is a number of facts, chronologically arranged indeed, but with no other coherence, which have to be committed to memory. There is a traditional mass of matter grouped under the successive sovereigns of England which nearly every school seems to feel itself called upon to teach. By far the greater part of this matter should be relegated to the dust-heap of history. Let us get rid of what Seeley so truly called "our childish mode of arranging history" —though, indeed, by 'childish' he meant 'foolish,' for no child would have invented it—let us recognise that the beginnings and ends of reigns were important, doubtless, to the passing and coming monarchs, but usually had little bearing on the course of events or the condition of peoples. Let us go further and bring home to our minds the truth that a knowledge even of the names of many past monarchs is of absolutely no use to our pupils. Let us determine also that names of battles, marches, and counter-marches of armies are frequently of profound historical insignificance. Let us, in a word, disregard the school tradition which we owe so largely to a discredited and largely obsolete kind of examination, and let us select our matter in the light of certain broad principles, excising without compunction all that will not stand our test.

Elementary Knowledge.

First, then, we will lay down that our pupils' knowledge must be elementary: the teachers have not time nor the pupils maturity for more. But we should remember that 'elementary' should mean that which is most fundamental, not that which is most insignificant, nor even that which is most easy.

Interest.

In the next place, the matter must be such as is calculated to evoke interest in the pupils. But again the warning must be given not to confuse the interesting with the exciting or amusing. There is a natural tendency for a teacher to choose the most picturesque and stirring incidents for his lessons. And this is good as long as those incidents are kept to their true and subordinate function of making the past live in imagination. But if picturesqueness is made the main test of suitability the history taught will be of little value in training the judgment and in helping the pupils to see the connection of cause and effect in human events.

True interest is an impulse always pressing towards satisfaction, yet never satisfied. It strives ever onwards, and is rather enhanced than deterred by difficulties. It values each step in its progress, not by its amusing or pleasing qualities, but by its serviceableness in the attainment of the end in view. Thus we may say with Seeley: "I am often told by those who, like myself, study the question how history should be taught, Oh, you must, before all things make it interesting! I agree with them in a certain sense, but I give a different sense to the word interesting, a sense which after all is the original and proper one. By interesting they mean romantic, poetical, surprising; I do not try to make history interesting in this sense, because I have found that it cannot be done without adulterating history and mixing it with falsehood.

But the word interesting does not properly mean romantic. That is interesting in the proper sense which affects our interests, which closely concerns us and is deeply important to us. . . . Make history interesting indeed! I cannot make history more interesting than it is, except by falsifying it. And therefore when I meet a person who does not find history interesting, it does not occur to me to alter history,—I try to alter *him*."[1]

That history is interesting in the sense of Seeley's remarks will be apparent to all who have accepted the views set forth in this chapter. It only needs to be set forth attractively by a competent teacher to excite the interest of every normal boy and girl.

Facts and Ideas.

It follows from what has been said that teachers should not confine their instruction to facts. Facts, indeed, are essential, but, to be either interesting or instructive, they must be illustrative of life and connected in causal sequence. Children who have reached their fifth school year are capable of comparing and generalising when the matter is not too complex, they are able to appreciate general tendencies though at first this insight fails to find ready expression in maxims and formulas. But unless the teacher has planned his course, chosen and arranged the facts he teaches round some few leading ideas which give character to the great world tendencies, such tendencies will not be seen by the pupils. Bad teaching or unwise choice or arrangement of materials may obscure the meaning of historical movements even more easily than the opposite qualities can exhibit them.

What then are the leading principles which should determine the selection of matter in such a course

[1] *The Expansion of England*, pp. 308-9.

as can be given during the last two or three years in a primary school? We cannot give them better than in the words of Mr. Frederic Harrison: "It is possible to know something of history without a pedantic erudition. Let a man ask himself always what he wants to know. Something of man's social nature; something of the growth of civilisation. He needs to understand something of the character of the great races and systems of mankind. . . . Let him ask himself what the Greeks taught or discovered: why the Romans were a noble race, and how they printed their footmarks so deeply on the earth. Let him ask what was the original meaning and life of those great feudal institutions of chivalry and church, of which we see only the remnants. Let him ask what was the strength, the weakness, and the meaning of the great revolution of Cromwell, or the great revolution in France. . . . Above all, we must look on history as a whole, trying to find what each age and race has contributed to the common stock, and how and why each followed in its place. . . . The history of the human race is the history of a growth. It can no more be taken to pieces than the human frame can be taken to pieces. . . . Once feel that all the parts are needed for the whole, and the difficulty of the mass of material vanishes."[1]

The teacher will, then, decide what are the answers to such questions, and will choose the material of his teaching so as to make those answers clear. Of course, if the majority of his pupils leave school at the end of the sixth year, he cannot go over the ground so fully as when he can spread the teaching over three years. But the difference should be in the filling of the scheme, not in its general outlines.

Guided by the main ideas he wishes to impress on his

[1] *The Meaning of History*, pp. 21-3.

pupils' minds, he will not allow himself to be trammelled by chronology. He will group his teaching round topics, though securing that the topics themselves are in correct time sequence. He will make his chronological divisions themselves at turning-points in history and not at mere artificial points, such as the reigns of monarchs, which often, as Seeley says, "create a division where there is no division, but rather unusually manifest continuity."[1]

Unity of Course.

It is obvious that such a course must be laid down in its entirety before the teaching is begun. There is no such thing as living from hand to mouth in effective history teaching, though unless each lesson be fully and carefully prepared, or a former preparation revised just before it is given, the teaching will become dull and lifeless. Nor can the teacher find his course ready planned for him in any of the text-books. They must be used as his servants, not obeyed as his masters. It is further plain that the best results will be secured only when the same teacher conducts the whole course with any one set of pupils, so that the study may be made to them an uninterrupted development. And, lastly, it is evident that this teacher must be enthusiastic both as a student and as a teacher of history, for whilst no subject is more inspiring and valuable when well taught, none is more deadening when badly taught.

Content of Course.

7. A scheme drawn up on these principles would take up into itself the lessons given in the preparatory course. The heroes with whom the pupils there made acquaintance are now seen as leaders and representatives of great movements; the beads on the string are now shown as stages and epochs in an organic growth.

[1] *Op. cit.*, p. 26.

Divisions.

There must be division into periods, but the teacher should be careful to remember that these are made by historians who, in looking back over the ages, can see how different modes of thought dominated men at different times, and who have, on this basis, divided time into epochs in each of which one such view of life was prominent. But the life itself flowed on continuously, and one period merged into another. As in the life of the individual we can mark the successive periods of childhood, youth, and manhood, each with its own characteristics, yet each fading continuously into the other, though at times change is rapid and marked, so with the history of civilisation. There are periods—often long periods—when change was comparatively slow; there are others in which all the foundations and landmarks of life seemed to be suddenly and violently upheaved. Such times of transition and unrest form the boundaries between the ancient, the mediaeval, and the modern worlds.

It will be well so to divide the course between the years over which it extends that ancient and mediaeval history are taken in the first year, and modern history occupies the remainder. If only two years are available, the division had better be made at the end of the sixteenth century, when the transition period was ending and the modern world well begun. If three years can be given, the first year's work had better end at the beginning of the transition period, about a century earlier, and the last two years be left for the modern period, dividing it at the point between the establishment of the independence of the United States of America and the French Revolution. These divisions, however, will be for the teacher's guidance. In the actual teaching they should not be emphasised.

Greece.

No real understanding of modern Europe is possible without a knowledge of the great heritage to civilisation left by ancient Greece and Rome. If history teaching is to fulfil its functions it must, therefore, begin with the ancient world. No detailed record can be attempted, but typical events should illustrate each movement and be made to live by full and detailed treatment, thus bringing home to the minds of the pupils the debt of modern Europe to the earlier nations.

It is true, of course, that history does not begin with Greece, but enough can be told of the great nations of antiquity—Egypt, Assyria, Babylon, and Persia—in connection with the Scripture Lessons. Of these old nations Persia was the survivor and under Cyrus reached the height of its power. Its organisation, its luxury, its mighty armies pressing west to conquest must be vividly described. Then follows its repulse by the Greeks—a people insignificant in numbers in comparison with its Oriental enemy. So arises the desire to know more of this wonderful race. The geography of Hellas and its influence on the life of its inhabitants should be examined.[1] Thus will become plain both the elements of disunion due to a country cut up by mountain ranges into naturally isolated tracts, and of union based on community of religion, customs, and language, and kept alive by the largely religious assemblies at the national games. The chief cities—Athens, Sparta, Corinth, Thebes—will be spoken of and their characteristic differences noted.

This, then, is the people which hurled back the Persians from the gate of Europe and saved the Western world from Asiatic forms of thought and government. The glorious battles in which Greece vindicated her claim to freedom appeal to the noblest feelings of our nature—Marathon

[1] *See* Grote, *History of Greece*, Part II., Chap. I.

where the Athenians under Miltiades rolled back the first flood of invasion sent west by Darius; Thermopylae, where the Spartans under Leonidas won death and immortality in arresting the second and greater army under Xerxes; Salamis, where the Athenian fleet under Themistocles scattered the armada of the national foe; Mycale, where the Persian power was so broken that it never again dared to attack the victorious Greeks.

The growth in power and glory of Athens and the extension of its influence over the islands will then be described: its preeminence in all intellectual culture—in science, in literature, in philosophy, in art, will be insisted on. A day's life in the city, with its market-place, schools, gymnasia, and temples, will be pictured and illustrated by views of its architecture and sculpture. Contrasted with this will be the hard and narrow life of Sparta. Then the inherent weakness of Greece will be made manifest by the long war which under the rival leaders, Athens and Sparta, divided the Greek states, and finally ended with the overthrow and degradation of Athens.

The rise of Macedon under Philip and its expansion under Alexander will then be shown, the extent of Alexander's empire with its dissemination of Greek culture examined, and the founding of Alexandria described. The disruption of the twenty years old empire immediately after the death of its founder will serve still further to illustrate the want of practical political aptitude of the Greeks.

Such a course of lessons will have made prominent both the strength and the weakness of the Greeks—their intellectual greatness and their political instability. As Mr. Frederic Harrison says, "The Greeks had created no system of law, no political order, no social system. If civilisation had stopped there, it would have ended in

ceaseless agitation, discord, and dissolution. Their character was wanting in self-command and tenacity, and their genius was too often wasted in intellectual license. Yet if politically they were unstable, intellectually they were great."[1]

Rome.

The very factors in civilisation wanting in Greece were the distinctive features of Rome. The origin of the Romans is lost in legend, but during the latter of the years which have been described in the story of Greece the nation was being formed by the amalgamation of two peoples, one of much intellectual power, the other of undaunted courage and iron perseverance. The resulting people showed the qualities of both. The gradual spread of the power of Rome over Italy during four centuries will be very briefly outlined in connection with the geography of the peninsula.

Then comes the life and death struggles with Carthage, lasting with intervals some hundred and twenty years, and ending in the final overthrow of Carthage—a struggle between two nations in marked contrast with each other. "On one side was the genius of war, empire, law, and art, on the other the genius of commerce, industry, and wealth. The subjects of Carthage were scattered over the Mediterranean, the power of Rome was compact. Carthage fought with regular mercenaries, Rome with her disciplined citizens. Carthage had consummate generals, but Rome had matchless soldiers."[2] The interest centres in the second of the three wars, and gathers itself round the heroic figures of Hannibal and Scipio, culminating in the subjugation of Carthage by the latter. Thus the Republic is seen pushing on its conquests and through war extending the blessings of peace, till after seven hundred years of fighting Roman dominion extended over the civilised

[1] *Op. cit.*, p. 49. [2] Harrison, *op. cit.*, p. 54.

world. Macedon, Spain, Gaul, and Britain were incorporated, and everywhere orderly rule and strict government were established.

But even during this growth of empire internal dissensions had been springing up; patriotism was giving place to party spirit; the constitution suited to a small state was found inadequate to a world-wide empire. The need for re-organisation had arisen and the genius appeared in Julius Caesar, who welded the Empire together by freely extending Roman citizenship to natives of the distant provinces, thus making Rome itself rather the leader than the mistress of distant nations. Though Caesar was assassinated by the old aristocratic faction, his work remained, and the Empire was firmly established under Augustus. Here the results of Roman dominion may be reviewed and exemplified by Britain—a Roman town and a Roman camp, Roman roads and other evidences of Roman civilisation being described and illustrated by pictures.

Next the spread of Christianity within the Empire should be traced, the early persecutions and final triumph under Constantine. Then should be noted the momentous change when Rome ceased to be the imperial dwelling-place, and the seat of Empire, after some wanderings, was fixed by Constantine at Byzantium, which he enlarged and which has ever since been known as Constantinople. Thus were sown the seeds of the disruption of the Empire, and of the continuous struggles between rival Emperors which marked the next century and a half.

To internal strife was added barbarian invasion, culminating in the sack of Rome by Alaric in 410. The defeat of Attila, King of the Huns, at Châlons in 451 must be emphasised, for this, as Freeman says, "was one of the most important battles in the history of the

world; it was a struggle for life and death between the Aryan and Turanian races, and Christianity and civilisation, and all that distinguishes Europe from Asia and Africa were at stake."[1] Nevertheless, power was passing more and more into the hands of the barbarians, who not only invaded the Empire, but settled in it, till in 476, by decree of the Senate, the line of Western Emperors ceased, and the Eastern Emperor was declared ruler of the whole. The settlement of the barbarians in the Empire is, of course, illustrated by the coming of the English tribes to Britain, but this cannot be understood if treated as an isolated phenomenon.

So the rise, grandeur, and fall of Rome will have been set forth. Not very many lessons will have been required, for only broad outlooks will have been taken, vividness being given by detailed representation of typical events. What, then, are the lessons to be learnt? Rome presents the typical example of successful government, and yet she failed because her empire rested on the insecure foundations of war and slavery. War was the main occupation of the state, so commerce and industrial arts were neglected; the capital lived on the tribute of the provinces; serfs cultivated the land whilst the free population crowded the towns. There was thus no permanent bond of union. Nor was such a bond supplied by religion, for the Empire tolerated all forms of religion. Thus, while the early centuries present examples of the noblest public virtues, the later show us a mass of public corruption. The real heritage of Rome to Europe is, then, the inheritance of her earlier years.

The lessons to be emphasised in a study of the two great ancient nations are well summed up by Mr. Frederic Harrison: "The Greeks founded the city, the Romans the

[1] *General Sketch of European History*, p. 105.

nation. The Greeks were the authors of philosophy, the Romans of government, justice and peace. The Greek ideal was thought, the Roman ideal was law. The Greeks taught us the noble lesson of individual freedom, the Romans the still nobler lesson, the sense of social duty."[1]

Transition to the Middle Ages.

The centuries of confusion and struggle which followed the fall of Rome should be very lightly passed over. Several points, however, are important. Thus, whereas in England the invaders expelled or destroyed the older inhabitants, and with them the civilisation which had been attained, in the rest of the Empire this was not so. The invaders were comparatively few and they settled amongst the former population, many of whose institutions survived in a more or less changed form.

Next the growing power of the Church should be noticed, and especially that of the Roman Pontiff. In connection with this the mission under Augustine sent by Gregory the Great should be described. Above all, the great work of the Church in keeping alight the lamp of civilisation, religion, and morality amidst the thick clouds of ignorance and grossness, and in gradually winning the barbarians themselves to her pure and ennobling faith, should be brought into relief.

The career of Mahomet should be briefly sketched, and the rise of Mahometanism with the rapid spread of the Arabic conquests over south-west Asia and north Africa must be shown as a European danger. The Arabic conquests in Spain in the early part of the eighth century accentuated the peril, but it was averted from west Europe by the defeat of the Saracens by Charles Martel in the battle of Tours in 732—a defeat which quenched for ever

[1] *Op. cit.*, pp. 51-2.

Mahometan hopes of conquering Western Europe, though incursions into the south still continued.

The temporary reduction of chaos to order by Charlemagne in Western Europe and by Egbert in England should be briefly narrated. The further invasion of the Empire by the Saracens in the south, the Hungarians in the east, the Northmen along the coasts of the west, and the Danes in England should be mentioned. In connection with this the work of Alfred in pacifying England and advancing civilisation should especially be insisted on. Then the establishment of the Duchy of Normandy by Rollo the Northman and the predominance of the Danes in England under Canute should be described. By the time of the conquest of England by William the new order of things was generally established in Europe.

The Middle Ages.

The Middle Ages have now been reached—a period showing many marked characteristics which endured without very substantial change for some centuries. The two institutions it is essential to understand are the Church and Feudalism. The mediaeval theory was that Western Europe was still essentially one community. "Men believed more than ever that Rome was the lawful and natural centre of the world. For it was held that there were of divine right two Vicars of God upon earth, the Roman Emperor his Vicar in temporal things, and the Roman Bishop his Vicar in spiritual things. This belief did not interfere with the existence either of separate commonwealths and principalities or of national churches. But it was held that the Roman Emperor, who was called Lord of the World, was of right the head of all temporal states, and that the Roman Bishop, the Pope, was of right the head of all Churches."[1]

[1] Freeman, *op. cit.*, p. 169.

On the religious side the Popes continually strove to make this theory a working reality. On the temporal side it was much less operative. The Emperor in practice was little more than one sovereign amongst others, at first a German, afterwards a Spanish, ruler elected by certain German princes. Still the theory held sway over men's minds, and unless it be grasped the clue to the history of the Middle Ages is wanting. In detail, the temporal organisation was Feudalism, which combined the old Roman element of holding land from the Emperor as the head of the State with the Teutonic element of personal service to the lord.

The topics chosen for special treatment in this period should, therefore, be such as bring out these two great aspects of life. Periods which do not vividly illustrate either may be passed over in few words or omitted altogether. The history will be centred in England, for the illustrations may be drawn from English history quite as effectively as from that of other parts of Europe. But the feudal relations of England to other countries, especially to Scotland and France, must be insisted on in any explanation of either the war with Scotland or the Hundred Years' war, for these were attempts to assert alleged feudal rights.

The nature of Feudalism may best be explained by beginning at the bottom of the social scale, with the manor dominated by the lord in his castle, and then working out the relation of the lord to his tenants and the kind of life which followed from that relation. The relation of the lord to his over-lord can be traced by analogy with this. Much of the power of the State is thus seen to have been parcelled out amongst the lords, whose power over their tenants was practically absolute. The tendency of this to lead to petty wars between nobles under a weak king is

well illustrated by the reign of Stephen. The struggle between barons and king, each to limit the power of the other, is seen in the compulsory signing of Magna Charta by John and the equally compulsory acceptance of it by subsequent monarchs. The tendency of kings to extend their power over the nobles should throughout be kept in the foreground, as it is the clearest indication of the gradual unification of national life in England as in other countries.

This struggle was brought to a climax in England by the Wars of the Roses, which are important because in them the old feudal nobility destroyed itself. It is this which should be emphasised, not the alternation of ruling houses nor the battles in which power changed sides. Thus Feudalism died in England long before it disappeared from the Continent, and the opposing forces become the people and the king.

The growth of the people in power will be traced both industrially and politically. The former is seen in the growth of towns and commerce, and was accelerated by the introduction of the Flemings into East Anglia by Edward the Third; the latter begins with the parliament of Simon de Montfort.

Keeping these main ideas in view the teacher will choose his topics. He will make them real by vivid accounts of the lighter side of Feudalism: the life in village and castle, the training of a knight, the idea of chivalry, tournaments, and the methods of actual war. He will describe the siege of a castle, and may make it living by reading the accurate and graphic account in the forty-third chapter of *The Cloister and the Hearth*. Similarly, life in town with its organisation into gilds will be described.

The Crusades show at once the growth of the influence of the Church and the characteristics of chivalry. At the

same time they are one of the causes which led to the break-up of the Feudal System. They will not be treated in detail, but the first under Godfrey of Bouillon, leading to the establishment of the Latin kingdom of Jerusalem, and the third, in which Richard the First took part, should be taken as types and told with sufficient fulness to make them real movements.

Opportunity is here given to show the spread of Mahometan power and to describe Saracen civilisation, nor should it be forgotten that there had been a Moorish kingdom in Spain since the beginning of the eighth century, which had attained a high degree of civilisation and which was not conquered by the Christian king of Spain till the end of the fifteenth century. Thus the long series of Crusades lasting from the end of the eleventh till the end of the thirteenth century get a meaning. They are seen to be phases in the long duel between Christianity and Mahometanism, and their ultimate failure will prepare the pupils' minds for the later incursions of the Ottoman Turks into Europe and their conquest of Constantinople in 1453. One of the great drawbacks to confining history teaching to England is that this great struggle, during which for centuries the fate of Europe hung in the balance, is ignored, whilst attention is concentrated on such petty events as the battles of the Wars of the Roses.

The other great institution to be illustrated is the Church. Of course the two series of lessons—those dealing with Feudalism and those treating of the Church—will run on side by side. We have separated them here for clearness in laying down the main lines the teaching should take: we are not drawing out a detailed syllabus. The Church is seen at first as the great preserver of civilisation and learning amongst war, ignorance, and brutal roughness of life. The meaning of monastic life

and the religious influence of the preaching friars should be brought out by vivid description. The work of the Church in founding schools should be made clear. Its struggles to assert its independence of the temporal power should be illustrated by the dispute between Henry the Second and Thomas of Canterbury. Its influence in secular matters may be exemplified in such great ecclesiastical statesmen as Grosseteste, William of Wykeham, and Wolsey. The advance of churchmen in the arts is shown by reference to the cathedrals, churches, and monastic ruins which remain to us. The existence of doubts as to the Church's doctrines and of discontent with the social system are both brought out in Wycliffe.

If the teaching is planned to emphasise these features of life in the Middle Ages, and is made vivid by copious detail and illustration, the pupils will learn more real history than if they memorise all the sovereigns of England and "the chief events in their reigns" as set forth by the ordinary school text-book. They will have lived in imagination in the Middle Ages, and will have seen law and order, industry, the arts and learning growing up under the protection of Feudalism and the Church; yet they will have found disintegrating forces at work, and will thus be prepared to find in the Renaissance and Reformation only the acceleration and concentration of existing movements, all making for a greater individual liberty of men and a greater independence of nations. For in the Church and Feudalism are seen the two great hindrances to the expansion of national life. The Church, by uniting all nations into one organisation, which exercised not only religious functions but many secular powers as well, made distinctions and separation between nations difficult. Feudalism, by subdividing the power of the State amongst the nobles, especially when many nobles

held fiefs in several countries, made the internal union of States unstable and insecure. Hence the demand for national unity took the two forms of a centralised civil government and an equally centralised national Church, of which membership should be as compulsory as is membership of the State.

Transition to the Modern World.

The dominance of these two ideas must be borne in mind in tracing the transition between the mediaeval and the modern world, especially in England. They explain both the civil and the ecclesiastical policy of the Tudors and the Stuarts.

But other influences must be noticed as leading to the break up of mediaevalism. Of one of these—the Renaissance—but little will be said, for the revival of classical learning can have but little meaning to a primary school pupil. But in its later and German form of the Reformation it must be dealt with, though the teacher must here be specially on his guard against an unfair presentment of the facts. The movement under Luther will be traced in outline, especially so far as it influenced events in England. The leading force in the Reformation in England under the Tudors will be shown to have been the desire of the sovereigns for absolute power and a centralised national life, and the consequent disposition to attack the Church as the chief obstacle to the attainment of those ends. The marriage question is then seen to have been only a pretext, and Henry's various experiments in matrimony may be left to repose in forgetfulness. With an interval under Mary the same policy was continued by Elizabeth, and a meaning is thus found in the religious persecutions of the time, which are seen to be as much political as religious in their intention.

Equally important in its results with the Reformation

was the movement towards geographical discovery made possible by the mariner's compass, which, tradition says, was invented by Gioja of Naples in 1302. The knowledge of the world then possessed by Europeans should be sketched and illustrated by reproduction of maps of the time. A picturesque examination of the mediaeval trade routes will explain the commercial supremacy of Italy. The discoveries should be seen as a race for the Indies. "The elements of this race are (*a*) the discovery of the Cape of Good Hope by Diaz, in 1486; (*b*) the discovery by Columbus, in 1492, of the West Indies, which lay in front of the great barrier continents; (*c*) Vasco da Gama's voyage to India in 1497-8; (*d*) Albuquerque's seizure of Malacca and the Spice Islands in 1511 and 1512, before (*e*) Balboa discovered the South Sea, and ten years before (*f*) Magellan reached the Philippines."[1] England's connection with the discoveries will be found in the voyages of Cabot. The great result of these discoveries was the substitution of the Atlantic for the Mediterranean as the highway of trade, and the consequent transference of the centre of intellectual and commercial life from Italy to the countries bordering that ocean. Of course the change was not sudden: it took a century to accomplish.

The general condition of the western European nations at the beginning of the sixteenth century should here be grasped. Spain had conquered Granada and united the whole peninsula, except Portugal, under one head; Sardinia, Sicily, Naples, Burgundy, and the Netherlands were, by marriage or by conquest, dominions of the Spanish king. When the thrones of Spain and the Empire were united in Charles the Fifth the restoration of the Roman Empire seemed about to be accomplished. But France was strong and compact, and both Francis of France and Henry of

[1] Bourne, *The Teaching of History and Civics*, p. 290.

England were young and ambitious. Portugal had no European dominions outside her borders, but had taken the lead in discovery in Africa and had found her way to India.

First Modern Period—the Balance of Power.

There are two main clues to the history of the three centuries which follow. The first to be apparent was the religious struggle which grew out of the Reformation. The second was the struggle for supremacy between the nations, especially for the possession of the New World. These cut across each other in many places, and neither by itself will explain the course of events. As Stubbs remarks: "Where Protestantism was an idea only, as in Spain and Italy, it was crushed out by the Inquisition; where, in conjunction with political power and sustained by ecclesiastical confiscation, it became a physical force, there it was lasting."[1] An exception is found in the Netherlands, where bad government in general and religious persecution in particular led to revolt, which, after forty years of heroic struggle, ended in the establishment of the Dutch Republic in 1609. By the end of the seventeenth century, however, the Reformation had practically ceased to be a force in politics.

But the other motive to strife continually increased in strength. Discovery involved appropriation. So, as Seeley says, the competition for the New World between Spain, Portugal, France, Holland, and England "is a formula which sums up a great part of the history of the seventeenth and eighteenth centuries."[2] An isolated treatment of English history, then, must obviously fail to give a true idea of the course of events. In this struggle distinct phases should be marked. In the sixteenth century Spain conquered Mexico and Peru, and

[1] *Op. cit.*, p. 268. [2] *Op. cit.*, p. 98.

Portugal annexed Brazil. For sixty years, from 1580 to 1640, Portugal was under the dominion of Spain. Thus the trade monopoly which was characteristic of Spain's foreign policy formed a barrier between the rest of Europe and America. In this will be seen the origin and, to some extent, the excuse of the buccaneering expeditions of Drake, Grenville, Raleigh, Hawkins, and other Elizabethan "sea-dogs," which, combined with English aid to the revolted Netherlands, and with religious differences, led to the Spanish Armada.

In the seventeenth century occur the English and French settlements in America, whilst the Dutch issued from their war with Spain the masters of most of their enemies' possessions in the East Indies. Towards the close of the century both Holland and Portugal have declined in power, Spain has remained stationary, but England and France have advanced. So the interest in the eighteenth century essentially centres in the duel between England and France.

It is, then, with the Spanish Armada that the modern history of England is seen to begin. From that time England should be shown as becoming more and more a power on the sea, and a commercial and industrial nation. Early in the following century it must be noted how she began to expand beyond her own shores by founding the American colonies, whilst the danger of internal war ceased with the union of England and Scotland under James the First. England took no direct part in the Thirty Years' War, a contest partly religious and partly political, which left Germany exhausted and the way clear for the greatness of France under Louis the Fourteenth. Interest for the time will be centred in the home struggle—also partly political and partly religious—between King and Parliament, and the names of Laud, Strafford, Hampden, Pym,

and Cromwell will be made familiar. The main thread is, however, soon taken up again when England challenges the Dutch monopoly of the carrying trade of the world. The changing alliances in the wars which were waged before England definitely took the lead in commerce show how largely religious affinities were subordinated to considerations of increase of power. The Revolution of 1688 brought England for the first time definitely face to face with France.

The power of the Empire will be shown to have been much shaken, not only by the Thirty Years' War, but by the incursions of the Turks. A brief retrospect will be needed. Francis the First of France had obtained the help of the Turks against the Empire, and they had conquered a large part of Hungary, and besieged Vienna. For a time their advance was checked, and Philip the Second of Spain, in alliance with the Republic of Venice, defeated them in the naval battle of Lepanto in 1571. A century later the persecuted Protestants of the Empire allied themselves with the Turks, who again besieged Vienna in 1683. The war went on till 1699, by which time they had been driven out of Hungary. So the danger which for centuries had threatened Christendom finally lost its terror.

At the beginning of the eighteenth century, therefore, England and France are seen to stand face to face, and with but short intermissions war continued between them for more than a hundred years, the prize being beyond the seas in America and in India. The internal history of England is uninteresting, and of little importance; the only really memorable event being the legislative union of England and Scotland. The incursions of the Old and Young Pretenders were primarily moves in the game of France. Such a war as that of the 'Spanish

Succession' seems inexplicable till the clue is grasped. "In reality," says Seeley, "it is the most business-like of all our wars, and it was waged in the interest of English and Dutch merchants whose trade and livelihood were at stake. . . . From 1660 to 1700 France had been the first state in the world beyond all dispute. But the Treaty of Utrecht left England the first state in the world, and she continued for some years to be first without a rival."[1]

During the twenty-seven years of peace—or rather truce—which followed, the positions of England and France in America and in India should be described. "The French claimed all America, from the Alleghanies to the Rocky Mountains, and from Mexico and Florida to the North Pole, except only the ill-defined possessions of the English on the borders of Hudson Bay; and to these vast regions, with adjacent islands, they gave the general name of New France. They controlled the highways of the continent, for they held its two great rivers. . . . Canada at the north, and Louisiana at the south, were the keys of a boundless interior, rich with incalculable possibilities. The English colonies, ranged along the Atlantic coast, had no royal road to the great inland, and were, in a manner, shut between the mountains and the sea."[2] In India each country possessed certain trading stations, and had begun to take a share in native quarrels. "The whole history of European Empire in India begins with the interference of the French in the war of succession in Hyderabad that broke out on the death of the great Nizam ul Mulk (1748)."[3]

The war of the Austrian Succession will then be briefly treated as really the first stage in the conflict which ended

[1] Seeley, *op. cit.*, pp. 130, 132.

[2] Parkman, *Montcalm and Wolfe*, Vol. I., p. 22.

[3] Seeley, *op. cit.*, p. 203.

with the Seven Years' War. The first appearance of Prussia as an important factor in European politics will be noted. Here stands out the figure of Frederick the Great, who, "with smiles on his lip and anguish at his heart, watched, manœuvred, and fought with cool and stubborn desperation." [1] By fixing attention on America and India it will be seen that there was no real cessation of hostilities between the nominal close of the former war and the formal beginning of the latter.

The Seven Years' War is of momentous importance, and made even picturesque by the heroic figures of the elder Pitt, Frederick the Great, Clive, and Wolfe. Its course should be traced in Europe, America, and India, not in detail, but in bold outline. "It is no exaggeration to say that three of its many victories determined for ages to come the destinies of mankind. With that of Rossbach began the re-creation of Germany, the revival of its political and intellectual life, the long process of its union under the leadership of Prussia and Prussia's kings. With that of Plassey the influence of Europe told for the first time since the days of Alexander on the nations of the East. The world, in Burke's gorgeous phrase, 'saw one of the races of the north-west cast into the heart of Asia new manners, new doctrines, new institutions.' With the triumph of Wolfe on the heights of Abraham began the history of the United States." [2]

The results of the war must be emphasised. "The Seven Years' War made England what she is. It crippled the commerce of her rival, ruined France in two continents, and blighted her as a colonial power. It gave England the control of the seas and the mastery of North America and India, made her the first of commercial nations, and

[1] Parkman, *op. cit.*, Vol. II., p. 402.

[2] Green, *Short History of the English People*, p. 757.

prepared that vast colonial system that has planted new Englands in every quarter of the globe." [1]

The revolt of the American colonies will next occupy attention. It must be seen how the overthrow of the French power in America made it possible for the colonies to dispense with the protection of the mother country. Neither the unreasonableness of the colonists nor the unwisdom of English statesmen, with such honourable exceptions as Burke and Pitt, should be hidden. The history of the struggle is not, in itself, fascinating, but the figure of Washington is heroic, and the result is one of the most momentous the world has yet seen. It was the birth of a nation which in little more than a century "has tamed the savage continent, peopled the solitude, gathered wealth untold, waxed potent, imposing, redoubtable." [2]

The twelve years which intervened between the close of the Seven Years' War and the outbreak of the American revolt had seen more peaceful victories. "In the year which followed the Peace of Paris two English ships were sent on a cruise of discovery to the Straits of Magellan; three years later Captain Wallis reached the coral reefs of Tahiti; and in 1768 Captain Cook traversed the Pacific from end to end, and wherever he touched, in New Zealand, in Australia, he claimed the soil for the English Crown, and opened a new world for the expansion of the English race." [3]

Second Modern Period—Ideas.

The last phase of modern history has now been reached. National rights and the balance of power are still forces, but the characteristic of this last period is the influence of ideas. The beginnings of this influence are, of course, to be found

[1] Parkman, *op. cit.*, Vol. I., pp. 5-6.
[2] Parkman, *op. cit.*, Vol. II., p. 429.
[3] Green, *op. cit.*, p. 758.

earlier; indeed, the American Declaration of Independence enunciates the fundamental ideas of the French Revolution. But it is with the latter event that the force of ideas becomes predominant. The chief of these guiding clues to the history of the last century are the ideas of nationality, liberty, and humanity. No full account can be attempted of this part of history, for the movements are often exceedingly complex. It is better to treat in some detail typical instances of the predominance of each idea.

The outbreak of the French Revolution must be seen as the inevitable result of the system perfected by Louis the Fourteenth and perpetuated by his successors. The early English sympathy with the movement should be made plain—a sympathy alienated by the excesses of the French. The wars which for a quarter of a century convulsed Europe will not be treated in detail, but the aims of the various great campaigns should be shown, and such leaders as Napoleon, Nelson, and Wellington will stand out in bold relief. Though all Europe was involved, the war will be seen to have been essentially a renewal of the duel between England and France, and the key to Napoleon's policy will be found in his efforts to recover for France her place in the New World. "He sees in England never the island, the European State, but always the World-Empire, the network of dependencies and colonies and islands covering every sea."[1]

Among the events dealt with in the period of the Napoleonic wars should be the partition of Poland between Russia and Prussia, for, says Dr. Stubbs, "it seems to me that the partition of Poland . . . was the event that forced the idea of nationality upon the world."[2]

[1] Seeley, *op. cit.*, p. 33. [2] *Op. cit.*, p. 271.

The workings of this idea should be shown in the liberation of Greece and the Danube provinces from the Turkish yoke, the unification of Italy, the consolidation of Germany, and, above all, in the growing feeling of a common nationality between the scattered parts of the British Empire. The important influence in this latter respect of the applications of steam and electricity to the means of communication, really knitting the parts of the world more closely together, should not be neglected. The growth of the English power in India and its consolidation after the Mutiny should be broadly touched upon.

The increasing influence of the ideas of liberty and humanity may be illustrated by the abolition of slavery first in England, afterwards in the United States, whilst the Civil War which followed the latter event gives a further illustration of the force of the idea of nationality.

The expansion of the power of Russia must be shown, and it will be well to trace briefly Russia's story since the time when, under Peter the Great, she first became of European importance.

These topics will involve sufficient reference to the great wars of the last hundred years.

Considerable attention should be given to the industrial and commercial development which began in the eighteenth century, and has done so much to alter the conditions of human life. The invention of the steam engine, the use of coal, the application of machinery to industry, the consequent growth of the factory system with its attendant evils and blessings, the increase of population and the shifting of its greatest density from the south and east to the north, the abolition of the Corn Laws, factory legislation, the improvement of communication by roads, canals, railways, steamships, and telegraphs, the institution of a cheap and effective postal system, the spread of the

means of education, are examples of topics which touch present-day life at every point and are, therefore, profoundly interesting and instructive to the young.

Some lessons, too, may be given on the relations of civic life. The history course should not have omitted to trace the steps of parliamentary reform by which the representative system has been made more effective. The ideas thus gathered, and those derived from every-day life on such subjects as government, elections, taxation, civic duty and rights, may now be knitted together and made more explicit. It should be remembered, however, that these subjects are not very attractive to children, whose knowledge of them, moreover, will naturally increase as they grow older. Care should, therefore, be taken not to make such instruction either detailed or frequent. Practical exercise in social functions, however, which is involved in the service of pupils on committees to manage various forms of social organisation, such as school sports, is altogether good. The best training in citizenship is indirect. When a boy has learnt what he owes to his country, he will feel that his country has a right to demand service of him, that citizenship not only confers rights but imposes obligations. And the surest way to arouse this feeling is by teaching him history to bring home to him the debt he owes to those heroes of religion, culture, discovery, commerce, industry, politics, and empire that have made England what she is.

Form of Teaching.

8. It remains to consider briefly the mode in which such a course may be made most successful. The aim, it must be remembered, is so to impart historical knowledge that a keen and permanent interest is excited in the pupils, and to train in them the power to use books, through which alone they can give scope to that interest in after life.

There will then be need for three main forms of presentation—by text-book, by oral teaching, and by additional reading; each of which should be supplementary to the others.

The Text-book.

The text-book should more and more become the backbone of the instruction as the pupils advance in age. The general method of using such a book has already been indicated.[1] Suffice it here to say that the reading should be made purposeful by well chosen preliminary questions; fruitful by being talked over by the teacher, and its results enlarged, organised, and vivified by his more copious and definite knowledge; and of permanent value by furnishing the material for written exercises which demand more and more power both of judgment and of analysis and synthesis as the pupils become more mature.

A good text-book should be one written by an author who is competent at once as a scholar and a teacher. Too many of those in common use are mere pieces of hackwork, the study of which engenders prejudice and false notions even when it does not lead to disgust with the whole subject. The true teacher of history will be very careful in his choice of a text-book. It should contain a well chosen selection of facts, with important dates, grouped so as to bring out the leading movements. There should be plenty of maps, and a few genealogical tables to throw light on such feudal disputes as the claims to the thrones of France and Scotland made by English kings.

Illustrations in text-books are not important, for their function is generally best served by the use of large pictures and lantern slides which can be talked over by

[1] *See* pp. 82-4.

teacher and class and so form centres round which the discussion of the matter which has been studied may be grouped. If they are present, however, they should not be fancy pictures of events, but such as really help in the understanding of the life of the past, similar indeed to the class-pictures which will be spoken of on a later page.

The teacher who wishes to adopt such a course as we have sketched will find himself somewhat limited in the choice of class text-books, for the great majority of those written for primary schools deal only with English history. Several text-books on general European history have, however, recently been published.

Oral Teaching.

Even when a good text-book has been found, its brevity necessitates that it should be but an outline which must be supplemented, filled out, and vivified. The text-book work should, therefore, be fitted into a course of oral teaching. In the oral lessons it is important at once to avoid overloading with facts and to escape the danger of an abstract treatment. The ideas and topics worked out in the last section are guides for the teacher, not formulas to be given to the pupils. Characteristic events described in sufficient detail to secure vividness in life, and grouped under the influence of those leading thoughts, will make the tendencies of movements clear to the pupils. The teacher's revisions and his summaries on the blackboard—which in all cases he should have prepared beforehand—are further helps in securing the desired result.

The oral lesson and the study of the text-book should be interwoven in every possible way. The former should continually appeal to knowledge derived from the latter, and the discussions on the latter can often be made an integral part of the former.

Illustrations. It is in the oral teaching that illustrations are most effectively used, for there they can be discussed in detail. Moderate sized pictures of which each pupil, or every two pupils, can have a copy are in many cases the most effective. Those of value in the text-book can be so used, and they may be supplemented by such pictures as are contained in Messrs. Horace Marshall's series of *Historical Albums*. Large pictures for class teaching have also their function, and when these are used it is essential that the pupils should have easy access to them at times when the lessons in history are not actually in progress, so that they may pore over them till the instruction conveyed has become an integral part of their historical knowledge. Now that the lantern can be used without darkening the room, slides are very effective modes of pictorial illustration; they can be produced at small cost, and as the selection rests entirely with the teacher, they can be adapted to his teaching more perfectly than is possible with pictures.

Whether pictures or slides, it is not the number but the quality that is important. Accuracy is essential, and the illustrations must be such as help the pupils to picture the past, not such as attempt to picture it for them. Portraits of great men; views of places where important events occurred; examples of ecclesiastical, feudal, and domestic architecture—cathedrals, churches, monasteries, castles, fortified towns, guildhalls, houses in town and country; armour, arms, and implements of war; siege operations; tournaments; the instruments of industry in various ages; means of transport—roads, bridges, waggons, ships at successive periods, early railway engines and trains; costumes and pastimes of the people at different times—such are the illustrations which are really of help in studying and teaching history. It is most desirable that

the school library should contain, and the pupils be allowed free access to, such books as the illustrated edition of Green's *Short History of the English People,* Barnard's *Companion to English History in the Middle Ages,* and Lavisse and Parmentier's *Album Historique,* which contains in its four volumes over five thousand pictures relating to mediaeval and modern history.

Visits to Objects of Historic Interest.

But far better than any picture, however good it may be, is an example of the actual thing. Full use should, therefore, be made of any historic remains in the neighbourhood by taking the pupils to examine them at the time they are being spoken of in the lessons. Districts vary much in the advantages they offer for vivifying history by this means. Few places can furnish such typical illustrations of earlier life as York, with its Roman tower, its walls and their gates, its castle, its minster, abbey ruins, and churches, its guildhall, its examples of domestic architecture from the manor house to the tradesman's dwelling. Winchester, London, Chester, Norwich, Worcester, Shrewsbury, and many other towns offer similar advantages. But at most places an old church at least is within reach. In many is a museum in which are exhibited old armour, arms, and implements of industry. Whatever there is should be utilised to the full.

Mere indefinite looking at such objects is worthless; they must fit into their appropriate setting of knowledge. If the pupils, then, are to be taken to see the remains of a castle or monastery, they should be prepared to examine them intelligently, by means of a lesson in school which brings out the purpose such buildings served, and the kind of structure adapted to secure it. As a record of this, each should, under the teacher's guidance, draw a rough plan. The reasonableness of the old planning will

often be brought out by the children's power of inferring its general outlines from their appreciation of the intention of the building. Armed with these plans teacher and class should then visit the ruins and go through them systematically, recalling the purpose of each part and noting its adaptation to that purpose. The visit should be followed by a lesson in which a vivid description is given of life in monastery or castle in the olden time, which thus knits together and revises all that has been learnt.

Of course, the same buildings may be visited more than once, each time with a special purpose. It is a mistake to suppose that one can exhaust mediaeval life in an hour. The castle, for example, after having been examined from the general point of view, may be visited again to emphasise its defensive character: such a visit would be a good preparation for a lesson on a siege. Or monastic ruins might on a second visit be viewed as exemplifying the successive phases of church architecture. Comparison should be made with old churches in the neighbourhood, which should also be visited. There is no difficulty in arousing in children an interest in such a subject as this, nor is the general and typical knowledge which should be given them difficult either to acquire or to impart. Its value in adding interest and giving meaning to almost every place visited in after life is obvious.

It is easy when visiting a building to keep the pupils' attention fixed on the right points. When the object to be examined is in a museum this is more difficult. The children naturally tend to let their observation flit from thing to thing. There are few ways of wasting time more absolutely than by indiscriminate looking at many objects, and few places offer more temptation to this than does a museum. Pupils as well as teacher should, then, know

the kind of things they are going to examine, and should enter the museum with an interest in just those things aroused by the school teaching. The teacher should know exactly where to find the objects he wishes to bring under his pupils' notice, and should be prepared generally with remarks and questions which will help them to keep their eyes and thoughts in the right direction. The visit has then every chance of being profitable.

Supplementary Reading.

In addition to text-book and oral lesson, supplementary historical reading is required. The two former aim at following the main current of affairs hand in hand; the latter at throwing side-lights on the main topics. It is clear, then, that the text-book should never be used as a reader, nor the reader as a text-book. In the fifth and sixth years such books as Mr. Finnemore's two little volumes on *Social Life in England*[1] should be put into the pupils' hands. These are short, and other readings may be chosen by the teacher from Plutarch's *Lives* or Froissart's *Chronicles*, or from a book of extracts from contemporary writers, which may either be read aloud to the class by the teacher or by individual pupils,[2] or, if the book is in the school library, may be read privately by the pupils in turn. This must obviously be decided by the size of class and library and by the teacher's knowledge of what is best for his pupils. In all cases the supplementary reading should bear on the systematic work then in hand. Historical novels as well as histories furnish much suitable supplementary reading, but the teacher

[1] Published by Messrs. A. and C. Black.

[2] Books of extracts suitable for class reading are the *Illustrative Histories* published by Messrs. H. Marshall and Son. The teacher will find many extracts which he may read to the class in Mr. Robinson's excellent *Readings in European History*. (Ginn & Co.)

should only recommend those which succeed in giving a true historical atmosphere. Historical poetry should also be pressed into the service; nothing is more calculated to rouse the feeling of enthusiasm without which history teaching is like seed planted on stony ground.

In the seventh year the class is usually not very large, and the pupils are old enough to work a great deal by and for themselves. The supplementary reading should here largely take the form of working out some easy topic set by the teacher from books indicated by him, not, as in the younger classes, of reading certain specified pages. It is evident that a library is absolutely necessary if this—the highest work in history of which the primary school is capable—is to be carried out.

Note-Books.

In connection with all these forms of teaching the pupils should keep note-books in which they should enter the summaries of the teacher's oral lessons, abstracts of their text-book study, references to illustrative passages in their supplementary reading, sketch maps, and drawings of parts of places visited and of some of the simpler pictorial illustrations. In a word, they should be thus trained to work at a subject in a way most profitable to themselves. No uniformity in detail should be insisted on; the teacher will find he has a quite sufficiently difficult task in training each pupil—even though he has two or three years in which to do it—to become fairly adept at self-instruction. In every note-book there should be a Time-Chart—a long line divided at regular intervals into periods of a century, on which the pupil should enter the most important events, writing those which refer to England on the one side and those which have no such direct reference on the other.

Throughout, history and geography should go hand in hand. History without geography is largely unintelligible,

and geography without history is devoid of human interest.

Connection with Geography. As Carlyle wrote to one of his nephews: "As to subjects for reading, I recommend in general all kinds of books that will give you real information about men, their works and ways, past and present. History is evidently the grand subject a student will take to. Never read any such book without a map beside you; endeavour to seek out every place the author names, and get a clear idea of the ground you are on; without this you can never understand him, much less remember him. Mark the dates of the chief events and epochs; write them; get them fixed into your memory—chronology and geography are the two lamps of history."[1]

Time Required. To work successfully such a scheme as has been suggested obviously requires that a larger amount of time be given to history than is usual in English primary schools. We believe that the great culture value of the subject quite justifies this. Three hours a week direct teaching, either by text-book or by oral lessons, in addition to the supplementary reading and the written exercises—which, of course, are lessons in English as well as in History—will be found sufficient, and is not more than the value of the subject justifies.

Conclusion. We will end this chapter even as we began it, and in doing so cannot refrain from quoting the last paragraph of Mr. Somervell's very suggestive article on the teaching of modern history in Mr. Barnett's *Teaching and Organisation.*[2] He writes:—

"Methods are after all but the 'dry bones' of teaching. 'There are very many in the open valley; and lo, they are very dry.' He only who has a genuine interest in the

[1] Quoted by Hinsdale, *How to Study and Teach History*, p. 94.

[2] Page 179.

story of the past, sympathy with the painful efforts and the slow achievements of men, and not less with their failures and their ignorance, can make the dry bones live. He only can gain for himself or impart to others, through the study of History, not merely an addition to knowledge, but the real spirit of History—a keen insight, a wide sympathy, a balanced judgment, an unfaltering love for truth. While he who regards the characters of his pupils as of more value than their attainments, who is quick to see, in the little world of school, the same elements of good and evil, the same forces of ambition and humility, of honour and cowardice, of truth and falsehood, the zeal for duty and the 'great refusal,' the self-seeking and self-sacrifice, that have shaped the History of Nations, will find in his lessons moments of opportunity which it will be his highest of all duties to turn to good account."

The following books are recommended to the teacher :—

On the Teaching of History:

†*Bourne: The Teaching of History and Civics	6/-	(Longmans).
Harrison: The Meaning of History, Chs. i.-iv.	8/6	(Macmillan).
Board of Education: Suggestions for the Consideration of Teachers, pp. 61-4, 119-124	8d.	(Wyman).

On the Connection of History and Geography:

Freeman: Historical Geography of Europe	12/6	(Longmans).
Freeman: Atlas to Hist. Geog. of Europe...	6/6	(Longmans).
George: Geography in Connection with History	4/6	(Clarendon Press).
†George: Historical Geography of British Empire	3/6	(Methuen).
Taylor: Words and Places	6/-	(Macmillan).

* These contain useful bibliographies.

† These are specially recommended.

On the Matter of History:

Wilmot-Buxton: The Ancient World ...	3/6	(Methuen).
Oman: History of Greece	4/6	(Longmans).
Wells: History of Rome	3/6	(Methuen).
†*Myers: Ancient History	7/6	(Ginn).
*Myers: Middle Ages	5/-	(Ginn).
*Myers: Modern Age	6/-	(Ginn).
Bryce: Holy Roman Empire	7/6	(Macmillan).
*Emerton: Introduction to Middle Ages ...	5/-	(Ginn).
*Emerton: Mediaeval Europe	7/6	(Ginn).
*Adams: European History	6/6	(Macmillan).
*Bourne: Mediaeval and Modern History ...	7/6	(Longmans).
*Hassal: Brief Survey of European History	4/6	(Blackie).
†*Robinson: History of Western Europe ...	7/6	(Ginn).
Church: Beginnings of Middle Ages ...	2/6	(Longmans).
Johnson: Normans in Europe	2/6	(Longmans).
Cox: The Crusades	2/6	(Longmans).
Seebohm: Protestant Reformation... ...	2/6	(Longmans).
Creighton: Age of Elizabeth	2/6	(Longmans).
†Green: Short History of the English People	8/6	(Macmillan).
†Seeley: The Expansion of England ...	4/-	(Macmillan).
McCarthy: Short History of our Own Time	6/-	(Chatto and Windus).
†Warner: Landmarks in English Industrial History	5/-	(Blackie).
†*Barnard: Companion to English History: Middle Ages	3/6	(Clarendon Press).
†Jessop: Coming of Friars and other Essays	3/6	(Unwin).
†Jusserand: English Wayfaring Life in Middle Ages	2/6	(Unwin).
Cornish: Chivalry	4/6	(Sonnenschein).
Oman: The Art of War: Bk. III., Chs. 2, 3, 5, 6, 7; Bk. VI., Chs. 2, 6, 7; Bk. VII., Chs. 1, 2; Bk. VIII., Chs. 1, 2, 3	10/-	(Methuen).

---

* These contain useful bibliographies.

† These are specially recommended.

Source Books:

†*Robinson: Readings in European History (2 vols.), each	7/-	(Ginn).
(An abridged edition in 1 vol. is published at 7/-.)		
Colby: Selections from Sources of English History	6/-	(Longmans).
Kendall: Source Book of English History	3/6	(Macmillan).
Illustrative Histories (4 vols.), each	2/- or 2/6	(H. Marshall).
(Specially suited for reading by pupils.)		

Class Text-Books:

Howard: Mediaeval History	2/6	(H. Marshall).
(The second volume of an excellent series of General History Primers, but rather too advanced for all but exceptionally good classes. Admirably suited to the needs of pupil-teachers and higher forms in secondary schools.)		
Wilmot-Buxton: Makers of Europe ...	3/6	(Methuen).
(Very brightly written. The best text-book for pupils under 14, but needs to be supplemented by a text-book on English History.)		
Britain as Part of Europe	1/6	(E. Arnold).
Wardens of Empire	1/6	(E. Arnold).
(Together constitute a good text-book for schools whose pupils generally leave at the end of the sixth year. The latter deals with the growth of the British Empire.)		

* These contain useful bibliographies.

† These are specially recommended.

CHAPTER XI.

THE TEACHING OF GEOGRAPHY.[1]

Function of Geography.

1. GEOGRAPHY has been well defined as the study of the earth in its relations to man. It forms the connecting link between nature knowledge in the widest sense and the physical needs of man as an individual and as a member of society. Such a subject may well claim a place in the curriculum of every school. Nothing is more calculated to remove insular prejudices than a study that brings home to the child his complete dependence upon world-wide activities, human and physical, which he cannot control, that makes him realise how many forces and how many hands have been at work, perhaps for months or years, in order to prepare the food which he eats and the clothing which he wears. As Emerson says: "The private poor man hath cities, ships, canals, bridges built for him. He goes to the post-office and the human race runs on his errands, to the book shop and the human race reads and writes of all that happens for him, to the court-house and nations repair his wrongs." [2]

Besides realising how much he is dependent on others for the physical necessities and luxuries of life, it is well that the pupil should feel to the utmost of his imagination

[1] By W. P. Welpton, B.Sc.

[2] Essay on *Commodity*.

that the world contains other peoples differing widely in thought, in language, in systems of government, in religion, in aspirations and ideals; whose life tendencies lead in many diverging directions. To realise as fully as possible the chief characteristics, social, religious, political, and commercial, of the peoples of the earth is to widen experience of human affairs, to know more fully what human nature is in its possibilities and limitations. With this broad sweep of his mind's eye, the pupil can view himself and his country in truer perspective. To know only ourselves is not to know ourselves. To limit our outlook to ourselves and our own immediate interests is to view life in the narrow field of a microscope, which, though magnifying the objects, limits the range, and so presents a view distorted in its relation to the world outside. To know ourselves we must know others; as Emerson truly says: "A foreign country is a point of comparison wherefrom to judge his own." [1]

In these ways geography affords the means of widening gradually the outlook of the pupil, until from an understanding of the people and country around him he, through his imagination, extends his sympathies and interests to include the rest of the world; and the success of the teaching of geography may be gauged by the ease with which the transition is made, whereby the pupil becomes aware that, besides being a native of some English town or village, he is also a citizen of the world.

Geography, like nature study, is specially valuable in bringing the pupil into direct relations with his material environment, and so gives direction and meaning to his observations out of school. Almost everything he experiences gains a fresh meaning and interest when it is seen as embodying or illustrating some geographical principle.

[1] Essay on *Culture*.

The dullest child will have come across something in his every-day life which is available in this way, and nothing is more likely to stimulate the young observer than to find fragments of information, which he has picked up here and there, taking their proper place in an organised system of knowledge. He may thus be led to see the value of keeping his mind open and alert with set purpose, and be trained not only to look, but to observe regularly and systematically; he will learn to regard his observations as means to the discovery of principles; and he will experience a keen pleasure in applying each new principle to explain other facts, of the meaning and bearing of which he had hitherto been ignorant.

The value of geography is, however, not confined to giving the pupil a rational appreciation of, and interest in, the phenomena of the physical world. The human outweighs the physical in importance. By extending his knowledge of other peoples, by realising the difference between their lives and his own as well as the common brotherhood in both, and by learning how far he is ever dependent on them not only for physical necessities, but for his language, his thought, his religion, his laws, he gains a broader and deeper view of all the important problems of spiritual and social life. His inborn sympathies tend to narrowness; his social activities move freely only in a narrow field, in the family circle and amongst his school companions. Gradually through intercourse with his elders, and perhaps through direct instruction, he realises to some extent that he is a member of wider communities. His sympathies broaden; the purposes and ideals of his church, his nation, his smaller circle of political, social, and professional friends become his own. His activities expand and a fuller life of more varied social functions begins to manifest itself.

To extend still further this life is the aim of the teaching of geography. The pupil's sympathies must not limit themselves to his own nation, nor his purposes and aims take account only of a narrowly patriotic good. Christianity teaches that all are brothers, and to all—white, black, or yellow—must the hand of fellowship and friendly interest be extended. Such a broad fellowship it is the work of the social or human side of geography to cultivate. To the teacher, geography must not mean simply the study of the earth; it must be above all else a study that will give a broader and deeper knowledge of the peoples of the earth, such a knowledge as will find its expression in fuller, more serviceable and more human interests, and in an all-embracing sympathy that will lead to a more complete life.

Relations with Other Subjects.

2. In the curriculum, geography occupies an intermediate position between the humanistic and the naturalistic studies and possesses some of the characteristics of both. On the humanistic side it gives descriptions of peoples with whose place in civilisation history deals, and on the naturalistic side it shows the dependence of man on climate, soil, vegetable and mineral productions whose properties it is the place of nature study to investigate. In these wide-reaching bearings on life there is much to appeal to the sympathies and interests, and consequently to awaken the intellectual and social activities of the pupils. Every child is curious to understand the subjects with which geography deals, and nothing but unintelligent teaching can quench that curiosity.

History.

It is impossible to read history intelligently without a good knowledge of the topography of the districts in which the events occurred and constant reference to a good atlas. But there is a more

important relation than this. Try to imagine the effects that would have been produced on British history by the existence of a land connection with Europe; then try to picture the history of Great Britain without the Welsh mountains, without the Southern Uplands and the Highlands of Scotland. The whole story of the relations of the various nations of North-west Europe would be fundamentally altered; the nations themselves would not have been the same, and even the individual inhabitants would have had different characteristics woven into the very fibre of their being.

The progress of civilisation, as seen in the history of Western Europe, has been in some measure determined at every stage by physical conditions, and this relation it is the duty of geography as an auxiliary to history to bring out fully and clearly. Fuller and truer knowledge of physical environment has nearly always resulted in changes, many of them momentous in the history of the world; for increased knowledge of his physical surroundings becomes for all practical purposes a new set of physical conditions influencing man's future progress.

It is easy to multiply instances, such as the influence of the Mediterranean upon the development of western civilisation, and the effect of the discovery of America and the Cape route to India in removing the centres of commerce, wealth, and enlightenment from Italy to the countries on the Atlantic seaboard. Such examples show most clearly how little understanding there can be of the fundamental problems of history without a thorough knowledge of the multitude of ways in which physical environment influences national and individual characteristics. If we ask to what circumstances some town or city owes its importance, the answer in the great majority of cases will be: Its geographical position. Great campaigns have succeeded or

failed as a result of the knowledge or ignorance of geography possessed by the commander, and according to the toughness and nerve of the victorious soldiers—assets of the nation to which they belong, hoarded up, it may be, during centuries of hard toil in an invigorating climate and upon a not too generous soil.

Enough has been said to show that, for the sake of history, geography must deal with the influences of physical conditions upon man, and that the geography of a country should be taught side by side with the history of its people, to throw light on those material circumstances that have influenced their welfare and have made for their larger or smaller share in the progress of the world.

Of course, the important but difficult problems hinted at above should not form the subject of special lessons in primary schools, but they should be ever present in the mind of the teacher, so that the close interdependence of geography and history may be brought out in dealing with each particular country and its people.

Nature Study.

Some of the fundamental notions of physical geography will be obtained in the lessons in nature study, such as simple observations on hills and valleys, rocks and streams, winds, clouds, and rain. And when geography deals with the connection between climate and productions constant reference will be made to the lessons on plants and animals and how they are influenced by position, soil, and climate.

Principles governing Selection of Matter.

3. Geography is an extremely wide subject; even those portions of it which are adapted to the purposes of elementary teaching are so extensive that a careful selection of topics is necessary.

Our guiding principle, in this as in all parts of the

school curriculum, will be the value of the subject-matter as an instrument of culture. The advantages of travel in widening a man's outlook and enlarging his sympathies have long been recognised by all, though enjoyed by comparatively few. "Travel in the younger sort," says Bacon, "is a part of education; in the elder a part of experience." To study geography is to travel in imagination. The aim of teaching geography is to bring distant peoples and lands near to those who stay at home; to help the pupils to realise by means of descriptions, explanations, pictures, lantern slides, maps, and models what these foreign peoples are, and how they live; to picture not only the externals of life, the country, the occupations of the people, their towns, houses, and dress, but their inward lives, what they hold most true in thought, in worship, and in beauty—all that is really human in life.

Culture Value.

In this way every people may read the pupils a lesson of something to avoid and something to emulate, something to condemn and something to admire and praise. Distant Japan and India will have their lesson equally with modern Germany and America, and in learning something of these old world civilisations the pupils may, perhaps, be led to reflect that the hurry and rush of America or the method and organisation of Germany have only accentuated one side of life to the neglect of others more highly prized in Eastern lands.

On its physical side geography must picture the great forces of the world that man has turned to his use or tries in vain to overcome. Trade winds, ocean currents, the tides, volcanoes, hurricanes, river and sea action on land, the sun and moon—these and their effects will be studied and, as far as the limited knowledge of the pupils will allow, explained. This aspect of the subject

has also a direct value in leading the pupils to realise the physical conditions on which work or business depends, so that they may always be ready to adapt themselves to changing circumstances in the production and distribution of the commodities in which they are interested.

Subordination of Facts to Principles.

The permanent value of the work done in school will be seen in two ways according as we look at the human or the physical side of geography. Its human influence will show itself in an increased broadness of view, in a greater openness of mind, in a more sober and serious attitude on broad national and human questions, in a disinclination to a superficial self-sufficiency and blatant self-advertisement. Such an effect is not measured by the number of facts that have been retained, but rather by the keenness and acuteness of interest in world questions, by the desire to read further and to get increased knowledge of the races of the earth—a desire which may lead the pupil, if opportunity permits, to see with his own eyes more of the conditions of life both of his own people and of those of peoples in foreign lands.

On its physical side, too, a knowledge of facts and detailed pieces of information is of little worth. A knowledge of facts has value only when those facts are interpreted by principles that underlie them and give them wider, deeper, and more rational meaning. Such principles bind into a rational unity experiences of seemingly widely different character. The value of the teaching, then, will be shown by the pupil's grasp of principles, by his power to interpret new problems by means of them, and by his keenness and acuteness in searching for evidence to bear out some proposed and possible explanation.

That principles are more important than facts, and that facts are only of value when interpreted rightly by principles, is too often forgotten. Indeed, one of the greatest disadvantages under which the teaching of geography has laboured has been a misapprehension on the part of many of those engaged in teaching and examining it as to what children may reasonably be expected to know after six or seven years' instruction. Though many efforts have been made towards removing this difficulty in the last decade much yet remains to be done. In a course extending over several years, it is almost inevitable that details of many places of little importance will be given, and that much time will be spent in trying to memorise them. It is well known that much of the time thus occupied is wasted, because facts rapidly disappear from the memory unless they are of special interest or are given a place in a rational system of knowledge. In other words, the only facts likely to be long remembered are those upon which the principles of the subject have been built, and those to which attention is constantly given in every-day life. Facts required but rarely, or wanted only for special occasions, may easily be obtained from a standard gazetteer, atlas, or text-book, and may then very properly be forgotten again. Such books of reference should always be at hand, and the elder pupils should be taught to use them effectively in connection with their reading of both geography and history.

It will be well, then, to dismiss at once from the lesson on geography the laborious memorising of all facts which are not necessary to the steady progress of thought in the subject, on the lines of the scheme of study adopted. At the same time the teacher must beware of going to the opposite extreme and allowing the pupils to make generalisations on insufficient data; and, while sparing no pains

to reduce the memory work to a minimum, he must make sure that this minimum is thoroughly learned. The study of no subject can attain anything either of breadth or of depth unless the chief facts and principles are thoroughly memorised as the learning advances. This, indeed, is one of the first conditions of success. If this is done, it will be found that the intrinsic interest of many facts of secondary importance will cause them to remain in the memory without effort.

Relation to out of school Experience.

In considering the contents of a scheme of study in geography it is important to remember how closely geography may be related to the out of school life of the pupil. Even nature study has its limitations in this respect and cannot be so well adapted as social geography to the needs of schools in the largest industrial centres, in which the familiar knowledge of the pupils is rather of facts and relations of industrial and commercial life than of the works of nature. The method of teaching geography may, therefore, follow without strain the important educational principle which insists that the work of the school should be so related to the general life of its pupils as to give fulness of meaning and of interest to that life. But instruction should go still further. It should not only give added interest and fuller meaning to the general life of the pupils, but it should lead them step by step to a higher and more complex life beyond. Thus, while the mode of approaching the subject at first will be determined by the natural and social surroundings of the school, yet, growing out of this, the instruction must enlarge and deepen the mental range of the scholars by introducing them in imagination to problems of a higher and more complex character, in the understanding of which they will more clearly comprehend the varying phenomena

of nature and enter more fully and sympathetically into the lives of peoples widely different from themselves.

The starting-point, however, is the life of the district, a life that must be viewed in all its aspects—physical, commercial, and social. It cannot be expected that young children can enter into this life very fully or understand it deeply. Yet here is the beginning; for all knowledge grows out of experience, and knowledge is deeper and more real the more closely it is bound up with the most vivid experience—experience that makes up the very warp and woof of daily life. Hence the pupils' earliest geographical knowledge should be of their own district, and afterwards should embrace other districts round about; next their own country and the rest of the United Kingdom; then Europe and North America, where the conditions of life are somewhat similar to our own, and where the people are bound to us by many ties of blood, interest, language, and a common past; eventually extending to districts whose peoples are more remote from us in interests and thought, and who touch our own lives at but few points. In this way the interests and sympathies of the pupils will gradually expand and embrace a wider and wider circle; yet all will be kept in relation to themselves, and much will receive meaning and interpretation through the knowledge gained by the careful study of the conditions and circumstances of their own lives.

The principle of building on the experience gained by a close study of the school district, valuable as it is, must not be carried too far. There is much in foreign lands and in the lives of foreign peoples that cannot be explained by reference to such experience. The races and religions of India and China, the black peoples of Africa, the great forests and prairies of America, the hot deserts of Asia are widely different from anything with which the

pupils are familiar. They are in bold and striking contrast to the every-day scenes of home. Much of the teaching of geography must consist in introducing the pupils to such strange scenes and to such new conditions of life, and many and various must be the devices used to secure that they realise them to the utmost of their power.

To obtain a really sound knowledge of the fundamentals of geography, systematic and regular school excursions are necessary. The function of these should be to systematise and develop the interest of the pupils in what is going on around them, so that on their walks they will note many things of social and natural interest. It is clear that the country school has many advantages in dealing with physical geography, while the commercial and social life around it is far less complex than is the case in towns. The difficulty in towns is that the details of social and commercial life crowd on the pupils in too great a profusion, while physical phenomena are obscured by miles of paved streets and rows of houses. The questions of social life, however, should be singled out one by one. The town hall, the policeman, the tramways, the public parks, the market, the railway station, and the multitude of shops are all external signs of a corporate life. The essential elements of physical geography should be studied in the public parks or in the immediate environs of the town. Though differing somewhat in the details, country and town geography in the main will follow the same general scheme.

The Geography of the Neighbourhood.

4. The study of geography, then, begins with the simple physical and social facts to be met with in the immediate neighbourhood of the school, and during the first and second years of the upper school the teaching will be mainly confined to leading the pupils to discover all they can about this area and

to explaining in a simple way what they see. The investigation of the neighbourhood will not cease at the end of the second year. Much interesting and important work in the study of physical relations, of rocks, and of contour can only be done when the pupils are older. Indeed, the most valuable work in geology and in measuring and representing contour should be left until the last year of school life. After the second year, however, the neighbourhood will cease to be the only geographical study of the pupils. Larger and larger areas with more diversified material and conditions of life will be dealt with in succession, until the physical phenomena and peoples of the whole world will in later years become the objects of study.

In studying the district, resort should be made to class excursions. As has been already mentioned, a village school is better situated than a town school for geographical excursions, though the latter should make the best use it can of its parks and environs, especially those in which stream, hill, and valley can be found. Fortunate indeed is the school where a compact valley with winding stream, waterfall, lake, alluvial flat, and hilly peaks can be found in a narrow compass and in the immediate neighbourhood. Not many excursions each year are necessary, and some of these can well be combined with those in connection with nature study; others need only be short—a half-hour to an hour in length—just sufficient time to note some few definite particulars about hill-side or stream on which the teacher wishes the class to dwell. Every excursion should be carefully prepared for, so that the pupils know exactly the nature of the problems they go forth to try to solve; and on their return the information gained should be turned to definite use in the making of plan or model, or in a course of lessons on physical phenomena.

The greatest need in the first two years of the teaching is to stimulate the pupils to observe carefully and to think about what they have observed. They should see for themselves whatever is within reach. But the teacher should not hesitate to give simple explanations and additional information when either will be of value. The power of conception and imagination of young children is not great, so that the teacher's main function will be to lead them to find in what they know or have observed imperfections of such a character that a little more careful observation and thought will enable them to arrive at fuller knowledge. By suggesting unsolved problems which become ever more and more difficult and numerous, the teacher should help them to gain the power of bringing what they already know to aid in giving meaning to newly observed facts, and of looking out for fresh facts to exemplify more fully explanations of well-known phenomena.

The teacher should not try to clear away every difficulty as it arises, but should endeavour to whet the children's curiosity by suggesting that an observation, of which the drift has been only partially apprehended, should be repeated or enforced by other observations which the teacher's practised eye sees that they have omitted to make. He should tell just enough to sustain their interest, but not more; children resemble their grown up friends very closely in caring little for what they can secure easily, but in pursuing zealously that which they can see a chance of obtaining by their own efforts, however great may be the difficulties in the way.

In this way the early work in physical geography will be founded upon the earlier nature study lessons and will grow naturally out of them. The meaning of common geographical terms, such as hill, valley, and river will become

familiar to the pupils, who will on the school excursions constantly meet with examples of them.

Preliminary Study.

It will be well to give in some detail an account of what should be done in the early study of physical geography before mapping is undertaken. The course of a river or stream forms a good starting-point. An example of a stream may be found almost anywhere within walking range of the school; if children cannot get into the country, streams may be found in the parks; as a last resource, an unpaved road or a piece of bare ground may be examined after a heavy shower, and will furnish examples true to nature of almost every kind of river action.

All the pupils will have seen enough of a stream to know the most obvious facts about it—that it consists of flowing water which keeps a definite channel, and that it flows from higher to lower ground. This implicit knowledge should be made explicit by means of conversation lessons, and the children should express clearly their idea of the essential qualities of a river. An obvious problem to suggest would be: Where does the water come from? A stream should be observed in rainy weather and in dry weather, and the young observers should be required to account for the difference noticed. Some of the water evidently comes from rain, as a greater or less amount of rain makes a corresponding difference in the amount of water in the stream.

A further problem may be suggested by asking why any water comes down in dry weather. Some streams then dry up, whereas others only diminish in volume. The pupils should make a list of streams in the district which have been known to cease flowing in summer, and of others which continue to flow all the year round. It will be seen that the streams which do not dry up are the larger ones.

But whence comes their supply of water? Appeal is again made to nature: Who has seen the beginning of a stream? What is it like? A lesson on springs yields the facts that water oozes out of the ground in many places, sometimes in just sufficient quantity to keep the ground damp, sometimes bubbling out and forming a stream of moderate size. The volume of a spring will be found to vary, being greatest a little while after heavy rain and least in dry weather, when some springs actually disappear. In every case the spring gives rise to a stream, which, uniting with others, forms a larger and larger stream. Various terms, such as source, tributary, confluence, right and left bank, may here be introduced.

The close connection discovered between streams and rainfall will direct the attention to winds and clouds. These should be observed daily, and the results tabulated and preserved: it should be noticed which are the warm winds and which the cold; which winds are accompanied by rain and which are dry; what kinds of clouds are seen in windy weather, dry weather, showery weather, etc. Much may be said in favour of systematic observation of atmospheric conditions throughout the whole of school life, with a view to forming the habit of observing them. Such observations can only be systematic when the results are recorded in some definite form of weather diary. The sky may nearly always be seen, even in towns, and is always beautiful; to accustom the children to see its beauties and to read its story will be to increase greatly their capacity for enjoyment.

To make clear the work done by streams, the water of a stream should be examined in dry weather and after rain. It will be found to be clear in the former case and turbid in the latter. Collect a bottle of turbid water; allow the water to stand for some time: the amount of sediment

obtained will be a surprise to all. Where has this sediment come from? Where is it going to? Notice how the stream cuts into its banks. What will be the result if this goes on for a very long time? Notice pebbles in streams. Why are some rounded? Why are not all rounded? Trace the history of a pebble—of a grain of sand. Notice where the stream enters a pond: a flat stretch of mud is produced. Why is this? What will be the effect of this in the course of time?

Simple observations may be made of the apparent movements of the sun and stars. A stick about five feet long should be pushed into the ground, and the variations in length and direction of the shadow of the stick cast by the sun observed regularly. A peg should be knocked into the ground to indicate the position of the shadow of the top of the stick, and observations made of the position of the shadow at noon each day for a week. The constancy of this position will suggest using it for reference, and thus the positions of the cardinal points can be taught. In order that these may be well known, they should either be painted upon the ceilings of the class-rooms, or a weather vane, with the N., S., E., and W. points fixed, should be placed either on the school buildings or at the top of a flagstaff in the playground.

The above details are only suggestive of the kind of work which can be done by children at this stage; they are not intended to be at all exhaustive. Models may easily be made of clay and sand, over which water can be poured to show the effects of denudation and deposition. Diagrams which, with a word written here and there, will adequately summarise the matter taught should be freely used. If this work is done thoroughly during the first and second years the pupils will secure at first hand much valuable knowledge which will provide them with ideas to give

fuller meaning and understanding to accounts of many physical phenomena in distant lands which can only be presented to the imagination through description aided by pictures and models.

Formal Study with Drawing of Maps.

The more formal study of geography may be said to begin as soon as a systematic attempt is made to represent the positions of various places on a map. It is not advisable to try to do this until sufficient knowledge of the district has been gathered by means of excursions to make a map of it not only intelligible to the children, but also a means of summarising and expressing this knowledge in a convenient form. This will usually not be until the second year is considerably advanced.

As the drawing to scale of simple plans is really a part of elementary mathematics, and is, consequently, treated in the chapter on that subject, it is unnecessary to spend time at the beginning of the geographical course in doing work which has already been done. It is obviously not worth while to try to deal with distance and direction on a large scale before a knowledge of simple computation and of angles has been obtained from the lessons in mathematics. It is, therefore, desirable that the pupils' work in geography should be confined to the study of the simple phenomena around them until their mathematical knowledge will enable them to construct to scale plans of such familiar and simply-formed places as the schoolroom and playground. This kind of exercise should be practised in the lessons on mathematical drawing during the second year, and then an attempt can be made to represent on a map the school and its surroundings, afterwards extending the boundaries to include such things as the main roads and railways, chief buildings, and other important landmarks within a radius of about a mile from the school.

In studying the contour of a district with a view to preparing a model or plan of it the class should be taken to some hill conveniently situated and from that vantage ground should examine the distances and directions of the principal landmarks. The teacher should have with him a large sheet of prepared black canvas, which he should spread out on the grass, and on which the various physical features and places of interest should be marked. Round this canvas the children should be grouped so that they can conveniently be questioned as to the names, distances, and directions of the various points to be noted. At first they can only compare distances and heights very roughly, merely judging that such a distance is greater or less than another, or such a hill is higher or lower than another. Direction should be fairly accurately determined by means of the mariner's compass, on the use of which lessons must be given before excursions for examining contour can profitably be begun. The teacher, by judicious questioning, by tactful criticism of answers, and by drawing careful attention to suitable modes of comparison, should encourage the pupils to represent on the sheet in a fairly accurate manner the district in view, and to indicate by suitable marks comparative altitudes.

When all is complete the plan thus prepared will become the subject of future study in class, and much additional and interesting information about the various places marked on it will be supplied by the teacher. The children, moreover, should be encouraged to discover in their private walks all they can about these places, and this information should be narrated by them for the benefit of the whole class. The map will be examined with a view to constructing from it relief models of the district. Each pupil should construct his own model, and it should then be examined carefully by teacher and pupil, so that the latter may

note and correct his errors. Finally, plans should be drawn from the model, and a second short excursion be taken to the same hill. The plans should then be compared with the features seen, the errors noted, and additional particulars added.

For further detailed class-room study of a district a prepared model should be brought before the class. This should have been made accurately from a six-inch Ordnance Survey map. The model can be constructed by selecting cardboard whose thickness will represent the vertical distance between two contour lines, and cutting pieces the exact shape of each contour line. When these have been fixed one on the top of the other in appropriate positions as shown by the contour lines in the map the whole structure will represent in relief the contour of the district. The stepped appearance made by the edges of the cardboard may be removed by filing them down or by covering the whole with a thin layer of plasticene or prepared clay. On this model the main roads, streams, and places of interest should be marked in various colours. Such a model will be of incalculable service in giving correct ideas of slope, relative distance, height, etc., and should be referred to constantly when any lesson on the district is in progress.

More advanced and accurate work should be done on the action of a stream. The fall in the stream should be roughly measured by means of a spirit level and a string about twelve yards long; the varying rate of flow, the deflection of the main current from one bank to another, and the eddying of the water should be carefully noted by spreading handfuls of bran or sawdust across the surface. The actual rate of flow should be estimated by stationing pupils at equal distances down the stream and noting the times taken by the floating bran or sawdust to reach the

successive points. The main current of the stream should be examined when it strikes a hard rock, high bank, or tree trunk, and the sandbank formed on the other side by the eddy carefully noted; this eddying and deflection of the course may be artificially produced by placing a large boulder in the stream or by damming half of it by means of a board. The difference in rapidity of the current in narrow parts and in broad parts should be observed, and the result of narrowing it artificially should be tested by experiment.

If there is no convenient stream in the neighbourhood, the action of rivers must be taught either by seizing the opportunity of examining a gravelly or sandy road after a heavy rain or by the help of a sand-tray. Indeed it is advisable to supplement and organise all the out-door work on streams by means of this latter contrivance. The sand-tray should be at least four feet square, made of tin or zinc so as to hold water, and with a rim of not less than three or four inches deep. Large supplies of fine and coarse sand and fine and coarse gravel are required. Almost all the effects of river action can be illustrated with such a tray if water be sprinkled by means of a very fine rose on a model of sand and gravel. A model of a river basin should be constructed, and hard and soft strata should be represented by sand and gravel. The water as it flows down the slopes of the sand will wear out a bed; tributaries will join to form a main stream; waterfalls, cataracts and rapids will be formed over hard strata, and smooth flowing rivers over softer material. Pebbles may be placed at various points in the main bed of the stream, and the winding of rivers and the formation of islands will be exemplified. Finally, the growth of sandbanks and a delta will be shown at the point where the stream enters the water at the bottom of the tray.

Advanced Study.

As has been said, the study of the district will continue after the second year, and will become more and more advanced in character. Specimens of rocks, fossils and strata as seen in quarries, gravel pits, exposed hill-sides, road or railway cuttings should be examined. The pupils should be practised in judging distances and heights with approximate accuracy by comparing them with well known distances or by pacing. A convenient standard of comparison is the distance between two successive telegraph posts. Distance may also be judged by means of the following device. If a long pencil be held upright at the length of the arm the apparent heights of various objects within range can be compared by moving the thumb up or down the pencil. If certain definite heights, such as that of a telegraph post, be compared in this way for various known distances certain data will be obtained from which a rough estimate of distance can be inferred.

In the seventh year the definite and accurate surveying of a small area can be carried out; and direction, distance and height accurately measured. The Ordnance Survey map of this district can then be studied, and the pupils made familiar with the representation of altitudes by contour-lines.

The meaning and use of contours may be taught in the following manner. A watertight tray is required and a supply of plasticene. It would be well if each pupil could have a tray for himself—an ordinary tin dish about 2′ deep would serve admirably. A model of a hill, preferably a hill in the neighbourhood, should then be made. The sugar-loaf pattern should be avoided; a slope of 30° from the vertical would be precipitous in a real hill. The avoidance of exaggeration in vertical relief is one of the most important lessons a student of geography can learn. The

tendency to such exaggeration is encouraged by the fact that generally when a section across a country, continent, or ocean basin is published the vertical scale is ten, twenty, or even a hundred times the horizontal. Quite commonly the real slope of the land is so slight, even in crossing so-called mountains and hills, that without considerable exaggeration of the vertical scale the elevations would scarcely be noticeable on a sectional drawing.

The hill having been modelled so that the top does not appear higher than the sides of the tray, place the tray level and pour in water to a depth of a quarter of an inch. Measure the depth of the water by holding a ruler vertically, with one end resting on the bottom of the tray. Notice where the water surface cuts the hill and scratch on the hillside with a needle along the junction line; pour in water up to half an inch in depth and make another scratch round the hill; then up to three-quarters of an inch and so on. If a quarter of an inch be allowed to represent one hundred feet, the hill will be marked with a series of lines each of which represents an altitude of one hundred feet above the line next below.

Now pour off the water and sketch roughly a plan of the contour lines; they will be represented by a series of rude rings, the smallest near the top of the hill and the others successively enclosing each other. Next cut vertically through the model of the hill with a sharp knife and observe the section after removing half the hill. Represent the section line on the contoured plan. Then, by taking distances along the line of section, raising perpendiculars where the section line cuts each contour line, making the perpendiculars a quarter of an inch above the base line for every hundred feet and joining the points so obtained, a curve will be obtained which will be of the same shape as the cut surface of the model. This may be proved by

cutting the paper section along the curve and fitting it to the model.

This process may be repeated with more complex models of plateaux, valleys, and detached hills; the pupils in every case drawing a plan of the model and contour lines, making a section of the model and a corresponding section from the plan, and fitting the two together. They should then be able to draw sections to scale across any district of which the contoured plan is given—the teacher being careful not to present too many difficulties at once.

The next step would be to model a simple district when its contour lines are given, by drawing sections in various directions and making a model. The result should then be proved by filling the tray with water, scratching a contour line on the model at each level and comparing with the original plan. It is a very interesting experiment at this stage to give the pupils a contoured plan of the school district, which can easily be obtained from the maps of the Ordnance Survey on the scale of six inches to one mile, and without giving any names allow them to draw sections across it and prepare a plasticene model. Then see how many of them can recognise the district from the model. Of course, this can not be done if the district is at all complex in its contour.

The contoured Ordnance Survey maps of the district and Bartholomew's maps, with coloured contours, on the scale of two miles to the inch for larger areas, might now be used for exercises in drawing sections until the pupils are able to interpret a contoured map with a fair degree of ease—reading at a glance steep slopes where the contours are close together; gentle slopes where they are separated considerably; hills where they are concentric rings; and valleys where they are V-shaped; and finding explanations

of the directions taken by roads and railways in the relative positions of the contour lines.

In spite of their difficulty a few sections of the school district to true scale may be attempted by the most advanced pupils; and the teacher would do well to prepare a few very carefully drawn sections of the school district to true scale to hang on the walls for them to see at any time. This should be done after they have ceased to make sections themselves of the same district.

Social Aspect.

It must not, however, be forgotten in the detail with which the physical aspect of the district has been considered that the human aspect is of at least equal importance. On this side of the instruction the social, industrial, and commercial relations of the people of the district should be examined and made definite and clear. In this elementary sociological study the notions of the dependence of each person on his fellows and of the manifestations of a corporate life in which common purposes are pursued for the common good will begin to take definite shape and form.

As has been already mentioned, village life presents a less complex human problem than the life of a large industrial centre. The squire, the clergyman, the schoolmaster, the farmers and their labourers, the village shopkeeper, the blacksmith, the joiner, the bootmaker—each is dependent on each for some kind of service.

From the interdependence of the elements of the village community the pupils should pass to the dependence of the village on the nearest market town. Village produce goes to the town; town productions come in exchange into the village. The fortunes of each should be traced. The farmer and his labourers grow the corn, and rear sheep and cattle. These are sold at the market town. The miller, the butcher, the tanner, the glue-maker follow.

Finally the goods are traced into the hands of the consumer, and in some part perhaps find their way back again to the village as flour, meat, shoes, and woollen clothes. Similarly, the fortunes of the tea, coffee, knives, cotton and linen goods, and other articles of the household economy that are brought into the village from without should be traced. Here is plenty of material upon which the imagination may be exercised. Clear, graphic, full and detailed descriptions should be given so that the pupils form living and realistic images of the various kinds of work in which so many people are engaged and through which the raw produce of the village and of foreign climes is transformed into articles of every-day use. Pictures, sketches, and, where possible, specimens of products in successive stages of manufacture should be freely used.

The interchange of goods between town and village leads naturally to the consideration of the means of communication, such as roads, railways, and canals, and of the means of interchange, such as carriers, markets and shops. From these the pupils can proceed to realise in imagination the more complex life of the market town.

In studying many of the commercial relations sketched above, attention will be drawn to objects and work of a public character. The roads, their making and keeping in repair, the postal service for the delivery of letters, the village constable, reading room and library, the parish councils, are all signs of a community life. The relations of these to each individual should be made clear, and such notions should year by year become more definite and exact and should receive enlargement as the pupils pass from the consideration of their own district to the study of their own and other nations.

Such a treatment of village life indicates the lines on which the teaching of the more complex life of a town

should develop. In a town commercial and social activities exist in such abundance and are so inter-related that the child is at first overwhelmed with confusion in an attempt to unravel them. The chief characteristics, however, should be emphasised, especially those which are brought strikingly under his daily notice, and those which have plain concrete embodiment in some building or object that can be examined. The life in factory, mill, warehouse, office, and shop, and the characteristic occupations of the people should receive attention. The life-history of cotton, wool, flax, iron, or whatever be the staple raw material used in the local industries should be traced, and various stages in the manufacture of the final product shown by means of specimens. The chief roads, with their tramways or 'buses, the railways, canals or river as means of communication between the parts of the town or between town and town should be dealt with; and the town hall, municipal buildings, law courts, public library and reading room, recreation grounds and parks, tramways, churches and schools should receive attention as evidences of corporate life. The whole teaching will refer continually to the pupil's daily experience, which should be enlarged by suitable excursions and by graphic descriptions and pictures. This, as the work progresses, should find an expression in a map made by each pupil, which will serve as a partial summary of his knowledge of the district.

A more Diversified Area.

5. The district having been studied on its physical and human aspects, the next stage in the teaching is to examine a larger area, so that more diverse physical and social conditions may be brought before the pupils. This can usually be begun with the third year. Fortunate is the teacher whose school lies in a geographical area

having types of many different physical features and various human circumstances. The county of Yorkshire is such an area, containing, as it does, a broad alluvial plain with its winding river ending in a deep and wide estuary; mountainous and moorland districts with narrow river valleys in both the west and the north-east; a varied coast line giving examples of bold headland and shingly cape, river harbour and sea harbour; types of pasture land with a population scattered in isolated hamlets, of arable land with numerous villages, and of an industrial area on a coal and iron field, the population of which is largely engaged in the manufacture of woollen and iron goods; while its county town of York is an excellent medium for introducing to the pupils the more striking and simple features of an old world city with its walls, cathedral, abbey, and guildhall.

Each part of such an area should be examined in sufficient detail to give a full, clear, and vivid picture of the chief kinds of physical features, and the occupations and varying circumstances of life of the people in industrial centre, agricultural village, isolated hamlet, sea port, and fishing town. No attempt should be made to present ideas of these by means of abstract definitions. Definition, as has been frequently stated, is of gradual growth, and should be the end and not the beginning of knowledge. Definitions have all the more meaning if arrived at through a wealth of varied particulars.[1] Hence the parts of this area should be presented by means of all kinds of devices —pictures, sketches, models, description, stories, lessons on the animal, vegetable, and mineral products mentioned— in a wealth of graphic detail, so that the children will, in imagination, really live in the places described and enter with full sympathy into the difficulties, hardships,

[1] *See* Welton, *The Logical Bases of Education*, pp. 221-9.

dangers, and work of those who, in this way and that, toil on the sea, or labour in mine or noisy factory to supply their numerous wants.

Only the chief and most interesting characteristics of each district in the area will be described. Thus, in dealing with western Yorkshire, the bleak mountainous uplands of the Pennines, the scattered hamlets of the shepherds in charge of the mountain sheep, the beauty of the river valleys with their waterfalls and woody slopes, and often with the lonely and sheltered abbey sleeping by the banks, and the warden castle guarding the entrance, will be the main human interest; while the action of water on hard and soft rocks, the formation of waterfalls, the winding of the stream, the flooding by heavy rainfall, the carrying of material by the river, either in solution or suspension, will be the chief physical topics of interest.

In passing to the coast no better starting-point can be found than Scarborough. Here will be found lines of hills projecting into the sea as headlands, and bays corresponding to the valleys. The action of the waves on hard and soft rocks, and the formation of shingle and sand, can be considered. Of human interest the fishing town with its harbour sheltered from the north-easterly gales, the life on a deep-sea fishing fleet with its hardships and dangers, the life-boat and rocket-station, the ruins of the mediaeval castle on the scar at the foot of which the town grew in size and importance, the spa, promenade, gardens, and sea drive, which evidence the fashionable health resort, will all be presented in picture and description.

Passing down the coast, contrasts rapidly present themselves. The precipitous limestone cliffs of Flamborough can be compared with the softer earth and clay cliffs to the north and with the low foreshore to the south which

ends in the long, low, shingly point of Spurn. The lighthouses at Flamborough and Spurn will suggest other dangers of the sea. The Humber offers a different scene —a busy river port for emigrants, trade, and fishing; and the advantages of a river over a sea harbour can be well illustrated by contrasting Hull with Scarborough. The deposition of suspended matter at the mouths of rivers and the formation of sandbanks here find exemplification, and the use of buoys and dredgers will be noted.

In a similar detailed manner the main characteristics of the agricultural area of the plain and of the industrial area on the coal and iron fields will be treated, and the whole will be summarised and brought into a connected system by lessons on the road, rail, and canal communications between part and part, and on the exchange of goods between district and district. In a general way work of a public nature will be illustrated by the keeping up of main roads, the maintenance of the coastguards and lighthouses round our coasts, and the provision of the means of education from village school to university.

Throughout the study of the whole area, such simple stories of historical events as appeal to pupils of this age should be told in connection with places or districts that are being described. We have already mentioned the importance of treating York as a type of an old world town, and in this connection tales of the incursions of the Danes, the conquest by William the Norman, the great siege of York during the Civil War, and the battle of Marston Moor may fittingly be narrated.

A good model is needed throughout the whole of this study, and an outline sketch map should be used side by side with it and filled in point by point as the teaching progresses, the different kinds of features being marked

by various coloured chalks. The pupils should also sketch maps and fill them in as the teacher's map is compiled. Care must be taken to compare, with regard to size and position, remote places with those already studied. To make sure that the new scale is grasped the school district formerly examined should be outlined in red on the map of the larger area. A scale of miles should be constructed on each map and the pupils should have frequent practice in calculating from measurement the distance from place to place, and in realising this distance clearly by judging how long it would take to walk it or to go by train.

Several maps should be sketched by the pupils so that they may become thoroughly familiar with the outline and main features. These maps may be most fruitfully used by marking the chief physical features and chief towns in each and then putting the names of manufacturing districts in one sketch, roads, railways, and canals in another, mining and agricultural areas in a third, and so on. In this way the sketch maps serve as a convenient summary for a large amount of geographical knowledge, and maps will gradually mean more and more to the pupils, so that, as time goes on, they will gain the power of so interpreting a map as to gain from it much knowledge concerning the physical aspects of the country and the conditions of the people.

The extension from the school district to a larger, but neighbouring, geographical area is not always advisable. It must be borne in mind that the larger area must be a geographical unit and not an artificial county area, and it must provide very varied material for study. Expansion from a midland town to a midland county may bring very few new features into the study, and then it would only lead to the verbal memorising of a number of names of places in the county. Where suitable enlargement is impossible it is better to pass direct from the

school district to the consideration of the whole country, treating one geographical area, such as the Pennine slopes or the south-west peninsula of Somerset, Dorset, Cornwall, and Devon, in considerable detail in a manner analogous to that already indicated in dealing with Yorkshire.

The British Isles.

6. The remainder of the third and fourth years should be occupied in the study of the British Isles. It is customary to teach the three kingdoms separately, but there seems to be no reason for this except tradition, whilst there are very many reasons, some of them overwhelming in force, for considering them as a whole. Many geographical areas in the three kingdoms are similar. The southern district of Scotland is, in physical features and in industries, very like the north of England. The Lake district, North Wales, the southern Highlands, the Killarney country and Connemara present many features in common, and in teaching should be classed as similar areas, so that a detailed description of one may stand in many particulars as a type of the others. The main justification, however, for teaching the three kingdoms as a unit lies in their commercial and political relations. If we would form a rational conception of British industrial areas and commercial centres the Clyde valley and Ulster must be included, and such ports as Glasgow and Belfast are an integral part of our commercial system. In considering the lines of communication it is the height of absurdity to stop short at Carlisle and Berwick on the northern routes, at Liverpool, Holyhead, Heysham, Fishguard, and New Milford on the western, because these places happen to be on the boundaries of England, and not to proceed straight on to Glasgow, Edinburgh, and Aberdeen, or to Belfast, Dublin, Cork, and Queenstown, which are equally parts of the routes, although they have not the privilege of being within the English borders.

Connections between various Aspects of a District.

It is a common plan in text-books to begin the chapter on the British Isles with lists of mountains and hills, rivers, capes, bays, seaports, and industrial centres, and this order of topics and mode of treatment have become somewhat traditional in the teaching of geography. It is not unusual for a pupil in his third year to start with Flamborough Head, and recite by heart the capes in their order of occurrence, until St. Bees Head marks the completion of the weary round. Whatever may be convenient in a text-book, such an order and mode of treatment is utterly unsuited to any teaching which aspires to something more rational than the exercise of verbal memory as the form of learning. Such modes of teaching are irrational, unnatural, and powerless either to satisfy intellectual curiosity or to awaken human interest. We have already insisted that the child's aesthetic and social nature should be provided with food on which it may be nourished and matured. Such food does not consist in names of places or towns, or in lists of industries, populations, and occupations, but in presentations of scenes of beauty and grandeur, and in pictures of the difficulties and dangers, hardships and trials, work and conditions of life of all those people in our land who, in some way or other, contribute to the needs of each of us, and who by common interests and purposes and aspirations are united with us in the bond of nationality. Intellectual curiosity can but shrivel and die if fed on such food as names of capes and bays and mountains. The things themselves must be made to live, and the rational relations between thing and thing must unite all into a connected system.

Mountain systems, river systems, and coastal features hold definite relations to each other. The character of the headlands is influenced by the land contour, which also

determines the direction, rapidity, length, and general nature of the rivers. The lie of the mountains and valleys, whether parallel to the coast or abutting on it, decides the formation of the inlets and capes. The kind of rocks, whether soft or hard, affects the character of the coast line, determines the depth and rapidity of the rivers and the nature of their beds, and the goodness, poorness, and amount of soil; and all these are factors in the conditions under which the people of the district live. For example, in the eastern slope of the Pennines, the rolling nature of the country in Northumberland and Durham give an uneven coast line, and no hills prevent the direct flow of the Tyne, Wear, and Tees to the sea. In the Yorkshire area, ridges of the North York Moors and Yorkshire Wolds project as headlands, and these hills, with the Lincolnshire Wolds, prevent the direct access to the sea of the tributaries of the Ouse and of the Trent, which, combining, break through a gap in the wolds and form the Humber. The low fore-shore and the comparatively soft clay and earth rocks of the eastern coast, when acted on by the sea, present a more or less even coast line, unfavourable for good sea harbours. The long eastern slope of the Pennine and the extensive basins of the Ouse and Trent originate deep and slow rivers, that give a natural access far into the heart of Yorkshire and Nottingham, and allow them when combined to flow to the sea as a deep and wide estuary which provides an excellent port, accessible at every state of the tide.

When taught in their relation to each other such features of the country appeal to the pupils' curiosity and desire for explanation. Each feature finds its place in a connected and rational system which coheres in the mind as a whole. Instead, therefore, of mere verbal memory being required, an organised and rational system of knowledge

must be intelligently constructed. No doubt, names must be learnt, and facts must be memorised. There must be repetition and revision. But monotony should be avoided. Fresh interest and keen attention should be secured each time by approaching the old problem from a new point of view, and by bringing some fresh form of activity into play.

Separate Study of Geographical Areas.

The rational connection between mountains, rivers, coast features, and conditions of life of the people suggests that, in the detailed study, the British Isles should not be considered as a whole, but as a collection of definite geographical areas. These connections can then be made thoroughly apparent. Consequently the first step in the teaching will be to mark out clearly the main geographical areas by an analysis of the build of the British Isles as represented in a good and large model.

Such areas will be:—The Eastern slope of the Pennines; the Western slope of the Pennines; the Lake District; East Anglia; the Thames valley; the Weald, with the North and South Downs; the South-west Peninsula of Somerset, Dorset, Devon, and Cornwall; Wales; the valley of the Severn; the Lowlands of Scotland; the Southern Highlands; the Northern Highlands; the basin of the Shannon; the South-east corner of Ireland; the North-east corner of Ireland; the Western hills of Donegal, Galway, and Mayo; and the South-west corner, including Kerry, Cork, Limerick, and Waterford.

The main characteristics of these areas having been noted and compared, the teaching should pass on to develop each in detail. The order in which they are taught should be decided by such considerations as the situation of the school, which district will give the greatest variety of material for initial detailed study, and which is best known to the teacher from personal acquaintance.

Districts similar in character should be studied in close succession, so that descriptions of one will be in some measure typical of the others, and so that the various parts of our islands will be linked together by associations of similarity and contrast.

The physical aspect of the area should first be grasped and should be accurately represented by a large plasticene model placed on one half of a large board, the remaining half being used for a sketch map of the same size, to be filled in as the teaching progresses. As has been already indicated, care should be taken to emphasise the relations between land contour, rivers, and coast line. Next should follow the climate, vegetable and mineral productions, leading on to the occupations and lives of the people and the chief centres of population.

As a preliminary to the consideration of climate there should be some direct observation of the weather of the district in which the school is situated. Such observations should extend over many months, and now and again should receive systematisation by a lesson on the subject. Direction of wind, temperature, clouds, and rainfall are the chief things to be noticed. Which are the prevailing winds, which are cold, which warm, which bring rain, and which are dry, which are the wet months and which the dry, what is the time for mists and fogs, should all be noted. Such observations form a good nucleus from which to expand the pupil's notion of climate.

Very little explanation of climatic conditions can be given at this stage, though the effects of mountains and of winds can be appreciated. The influence of winds blowing from warm and large oceanic areas should receive special attention, and should be made intelligible by a few lessons on evaporation and condensation. But the pupils mainly need to acquire a large number of particular

ideas concerning the differing climates in the South and the North of England, Scotland, and Ireland. These ideas should be made living by as many and as varied illustrations as possible—by reference to the kind of vegetation, the difference of the seasons of the year at different places, the migrations of birds, the positions of health resorts, and any other interesting details which will make real the nature of the climate and its influence on the habits of the people. Thus will be laid a ground-work of particular experiences from which, by comparison and contrast, the climates of foreign countries can afterwards be realised more effectively, and from which at a still later stage fundamental conceptions of the causes and effects of climate can be inferred.

As the pupils advance in intellectual grasp much more can be attempted in bringing out the ways in which physical conditions influence vegetation and the occupations of the people. They will readily appreciate how the warmth and moisture of prevailing winds make for luxuriant vegetation when soil conditions are favourable, and how the presence of coal and iron beds or the existence of a large and deep estuary in a great measure determines the occupations of the people. They should then pass on to consider, in a simple and elementary manner, how the kinds of rock characteristic of a district determine the nature of that district. Chalk hills, soft sandstone, hard granite, and alluvial soil have each characteristic land contours and vegetation.

The bare crags of the Cumbrian heights, with their scanty vegetation, the rolling grass hills of the Downs, the heather moors of the Yorkshire Pennines, and the grassy moors of the Peak district are explained by the nature of the rock in each area. The relation between them can readily be shown to pupils of this age, if such well-known

rocks as granite, chalk, limestone, clay, and sandstone be examined. From their structure much can be inferred with respect to the effects of rain and frost in wearing them away and so forming suitable soil for the growth of plants. These elementary ideas in geology will receive considerable extension when in later years the pupils begin the study of Europe and of the world. Volcanoes, volcanic rocks, the formation of aqueous rocks and mountain chains, and the denudation of the earth's surface will then be treated, and certain geological principles will be enunciated that will give interest and unity to many geographical facts.

The social aspect of the area having been examined, there remains what may be called the historic aspect. Much of this may be taught incidentally during the lessons on the physical and social aspects. Whenever abbeys, castles, or old towns are mentioned they should be dwelt on, and examples of them should be shown in picture or in lantern slide. Important and interesting historic incidents should be narrated in a simple and graphic manner. Hereward the Wake will be associated with the Fens; Drake and Raleigh with Devon; the castles of the north, Flodden Field and Chevy Chase with the Cheviots, and so on. Names of places should receive great attention, as they illustrate many points of history in an interesting manner. Avon and ouse, pen and dun, worth, borough and ham, by, wick, and ford will then mean something in the history of the land. Mr. Taylor's excellent book on *Words and Places* should be known by every teacher, and such information as is there stored up should be brought into the teaching to make the very names of mountain, stream, and village of historic value. At least one old city with a wealth of mediaeval remains should be vividly set before the pupils by means of story, description, and pictures, in

which not only the old buildings but many interesting features in the lives of our ancestors should be sketched in simple and bold, yet graphic, outline.

The beautiful scenery of the area should be so presented as to arouse the aesthetic appreciation of the pupils. Nothing here can be so effective as lantern slides well used. Many slides are not necessary. On the contrary they are a hindrance to successful learning; for a quick succession of pictures leaves only a confused blur on the mind. Each picture should be dwelt on and talked about from this aspect and from that. Slides should be shown again and again and compared with each other as to the beauties of mountain, valley, and lake, and woodland. A teacher who has visited many of the scenes of grandeur, beauty, and charm in our islands and has dwelt on them lovingly, or who, though unacquainted with them by travel, can, through reading and the study of pictures, describe the grandeur and sublimity of the rugged peaks of Wales, the calm beauty of the English lakes, the wild and rugged coast of Tintagel, or the peaceful repose of a Worcestershire village, will make these places live in the minds of the pupils. With such pictures in their imagination the teacher may call on the poets to lend him aid, and beauties hitherto unseen will be revealed.[1]

The British Isles as a Whole.

Each area having been pictured, the British Isles should again be studied as a whole, but now a whole of vastly more meaning and life than that with which the teaching began. The scattered facts of each area will now be brought together into a system. The industries and commerce, the chief lines of communication by road, rail, and sea, London as a centre of national life, and the sea and land forces

[1] *Cf.* pp. 162-3.

that protect our islands will be the main ideas round which the teaching will centre.

Industries, Commerce, and Lines of Communication.

The teaching of the industries, commerce, and lines of communication can well be prefaced by a brief but clear description of industrial and commercial England before the age of steam changed the centres of population from the South and East to the North and Midlands. The pupils should know in broad outline of the great woollen trade of mediaeval England, of the introduction of various industries from the Continent, of the manufacture of goods by hand in the homes of the workers, of the pack-horses and pack-horse bridges, of the great fairs, and of the visits of the fleets of Venice and Genoa. The conditions that made for modern industrial and commercial centres should be examined. The pupils should see hand work replaced by machine work, road and canal by rail, the sailing ship by the steamer, and thus realise that coal and iron fields and nearness of access to a port are now-a-days conditions of industrial greatness. They will trace the rise of such towns as Liverpool, Glasgow, Belfast, Newcastle, and Middlesbrough, and the comparative decline in importance of places like Bristol, Rye, and Bideford

In presenting a rational account of the industrial centres of the British Isles the important coal and iron fields should be marked by shading on sketch maps, and then the circumstances that make each area a cotton, woollen, hardware, shipbuilding, pottery, or other centre should be considered. The chief industrial and commercial characteristics of each area should be studied, and the pupils will be interested in learning something of the processes by which many articles are made, while the conditions of life of the people engaged in each industry should take a prominent place in the teaching. Not many

towns need be considered, and only the most important in each industrial area should be placed on the pupils' sketch maps. These should be thoroughly committed to memory.

As an aid to grasping the industrial centres as a whole, industrial areas should be compared, and those similar in character should be grouped together. The shipbuilding on the Clyde, Tyne, Thames, and at Barrow, Belfast, and Devonport should be contrasted. The industrial area of the Clyde should be compared with those of Yorkshire, Lancashire, and the Tyne. By means of such comparisons and contrasts the pupils will appreciate more clearly the many and various conditions that make for industrial success. They will begin to understand that geographical features are of great moment in deciding where a great port or a great industrial town will grow up, and will see that sometimes the raw produce is brought to the coalfield and at others the coal is brought to the raw produce.

The areas devoted to crops and to pasture should be dealt with in a similar manner, and the fishing stations and the migration of the fishing fleets furnish an important and interesting topic.

The study of the communications by land and sea will naturally follow that of the industrial and commercial centres, and here the position of London as the business centre of the British Isles must be noted. Its vast shipping, its numerous industries, its teeming population should be described, and its financial and business connection with every industrial and commercial area in the country made clear.

It will soon be evident that as the centre of English business life London must be the centre of the network of communications that bring it into connection with every part of the British Isles and every part of Europe and the

World. The pupils should infer where the main lines of communication in the British Isles will pass, by considering the circumstances of each area and by examining the contour of the country from a good orographic map or model. It will be seen that in the main the railways follow the ancient and natural lines of communication. One runs into Scotland up the broad vale of York, and thence near the coast to the gap between the Cheviots and the sea and so to Edinburgh; another up the coast strip of Lancashire through the passes of the Cumbrians and the Carlisle gap to Glasgow. The Irish route follows generally the old Watling Street to Chester, thence by the sea coast to Holyhead and across the Irish Sea to Dublin. The system of land and sea routes that bind the various areas in the three kingdoms into an industrial and commercial unit should be considered as a whole; only so can the British Isles be grasped as a single national and industrial organism.

But only a vague conception of the commerce of the British Isles can be reached without some knowledge of the world as a whole. Undoubtedly it is best to study thoroughly and comprehensively the commerce of Britain in connection with the development of industry, commerce, and empire during the nineteenth century, a topic which should be considered in the course on history in the sixth or seventh year. Some simple notions, however, of the relations between the British Isles and the rest of the world are needed at this earlier stage.

General Notions of the World.

The pupils must know that the earth is a sphere, and must have a clear idea of its division into oceans and continents. A large globe, on which only the most important features are marked, and those with great boldness, is essential in this teaching. The countries in close political

and commercial connection with our own land should be pointed out, so that such facts as that tea comes from China and India, cotton from the United States, Egypt, and India, timber from Canada and Sweden will mean something to the pupils. Though at this stage little can be learnt about these countries themselves, yet a considerable amount of information about the things we get from them should be given. Tea and cotton plantations, forests and timber felling, the mulberry tree and the silk worms, sheep and cattle ranches should be described, and the history of important imports from the place of production to the hands of the consumer should be traced.

No attempt should be made to prove the rotundity of the earth. This fact, like many others in geography, must be presented didactically, but it should be illustrated by every means in the teacher's power. The rotundity and size of the earth are no doubt large conceptions for the young mind to grasp, and it is hardly likely that at this stage they will be true and full. We must remember, however, that there are several years of school life before the pupils in which these ideas should become clearer, fuller, and more real. More complete and thorough treatment will be reserved until the pupils have greater depth and breadth of experience, and until it is necessitated by the course in history having reached the Age of Discovery. Reference, of course, should be made to ships sailing round the world, and to the gradual disappearance of ships at sea. These facts should not be given as proofs, but simply as illustrations to help in securing a fuller realisation of the ideas on which they throw light. The latter illustration, perhaps, is best shown by means of a large globe, round which is passed a ribbon with small representations of ships attached. As the teacher slowly moves this ribbon round the pupils will

notice the gradual disappearance or appearance of the ships.

London as Centre of National Activity.

London as a centre of national activity now remains to be considered. No abstract treatment of this conception should be attempted. Only broad plain facts that can be exemplified by people, events, and buildings should be noticed. The course in history will gradually bring clearer, fuller, and deeper notions concerning national life. Buckingham Palace and the Houses of Parliament at Westminster will typify the constitution; and a simple sketch of an election, the passing of a bill, and the work of such important ministers as the Premier, the Home, Foreign, and Colonial Secretaries should be given. The Law Courts will represent the centre of justice; and judge, counsel, plaintiff, defendant, and witnesses will be pictured. Westminster Abbey and St. Paul's Cathedral, as great historic buildings and the burying places of our national heroes, should be dwelt on with reverence. Fleet Street should be shown as the news-centre of our island, and our postal and telegraph systems may well be sketched by outlining how news is obtained and circulated among the people. The British Museum, the Museums at South Kensington, and the various Art Galleries will give opportunity for dwelling on the more cultured side of our national life.

Attention may then most fittingly be transferred to the two ancient English seats of learning, Oxford and Cambridge, and to the Universities of Scotland and Dublin. Simple notions of the educational work of these places should be given and pictures of the most important and most beautiful of their buildings shown. The growth of the industrial centres will account for the rise of our modern universities in London and the provinces.

In a similar manner Edinburgh and Dublin, as the centres of the more local life of Scotland and Ireland, should be briefly pictured.

The navy and army as means of national defence should receive attention. The importance of our navy should be brought out by reference to the fact that our country is a group of islands, to their position, and to the extent of our empire and commerce. The important naval centres should be located and described, and the reason for their position made manifest.

Relation of Courses in Geography and History.

7. At the beginning of the fifth year an entirely new set of conditions is met with which influences profoundly the course of teaching in geography during the two or three concluding years of school life. In history the pupils are about to begin an organised course on the great movements of European civilisation. Beginning with the city states of Greece they will trace out the advance, decline, and final fall of the Roman Empire. They will see Feudalism and Christianity slowly bringing justice and settled government, and nation after nation consolidated into something of its present form. They will note how the hordes of Arabs, Huns, and Turks invade the frontiers on the east and south, and how, one after another, they are hurled back. The age of discovery and of religious strife will take them over the Atlantic and Indian Oceans to watch the foundation of European settlements in America and India, until the eighteenth and nineteenth centuries will bring them to the rise of western modes of life in Australia and South Africa. Finally, the closing years of the nineteenth century and the opening years of the twentieth will bring China, Japan, and Russia prominently under their notice.

To understand these progressive and extending move-

ments is the great and complex problem that faces the pupils, and these are the new conditions which the teacher must examine and weigh in arranging the choice of matter and the order of topics in his teaching of geography.

Two kinds of forces, one human, the other physical, have determined the advance or retardation of civilisation. Religious fervour, quickening thought, and commercial and industrial enterprise on the one side, and fanaticism, ignorance, and barbarianism on the other are some of the human agencies; while climate, fertile plains, wild mountains, dense forests, broad-flowing rivers, arid deserts, and maritime facilities are among the many physical influences that have determined the fate of nations. History deals with the former agencies; geography with the latter. But no line can be drawn to fix the bounds of the physical and human spheres. Their influences are so interwoven in the web of events that to unravel and separate each from each is beyond the wit of man. Hence, the study of geography on its human side is intimately and intricately bound up with history, while the physical aspect of history seeks its explanation in the study of geography.

The aim of the final course of geography is seen, then, to be a most complex one. The teaching should, in placing before the pupils the physical conditions of countries and continents, seek to explain historical events. It should give an account of the lands and peoples that, in the course of history, are the successive centres of interest. The build of a country; its position relative to the influence of other nations; the presence or absence of natural resources that make for or against progress; the characteristics of the people—their genius in taking advantage of nature's gifts, their courage and enterprise in rising above its frowns, and the results in thought, religion, art, government, industry,

and commerce that have resulted from their labours; these it is the function of geography to set before the pupils fully and truly.

From this account of the function of geography in the upper school, it follows that the order of topics is determined by the sequence of history. The teaching should begin with Europe in general, and with the Mediterranean area in particular. Asia Minor, the Levant, and the northern shores of Africa should not be excluded. These, both politically and geographically, are part of the Mediterranean area, and were subject to the movements that began and spread around the shores of that sea. Their peoples, religions, art, climate, and natural resources are similar in the main to those of the other countries around its borders. The Barbary states have affinities with Spain; Asia Minor with European Turkey. Egypt alone stands apart, on account of the peculiar physical conditions that made it the birthplace of civilisation, and, combined with its position relative to India, have throughout the ages swept it into the flux of European politics. Europe and the Mediterranean will, then, be the subject-matter of geography, as long as historic interest centres in that area; when the progress of events brings the New World, the ancient civilisations of Asia, and the modern colonies in Australia and in Africa before the eyes of the pupils the course should be extended to embrace the whole world.

The order in which the various countries are dealt with should follow the main course of events. With the history of Ancient Greece will come the physical aspect of that country. Italy will be considered in connection with the growth of the Roman Empire; Spain, France, Germany, and Austria, with the expansion of that Empire over those countries, with the barbarian invasions, and with the birth of European nations. Asia Minor, the Holy

Land, Egypt, the northern shores of Africa will be studied most naturally when the Arab invasions are the historical centre of interest, and the Balkan States when the invasions of the Turks are under consideration. The Netherlands, Scandinavia, and Russia will complete the whole continent, though these countries do not come prominently into European history until after the Reformation.

With Vasco da Gama and Columbus the interest will cross the seas to Africa, Asia, and America. The conquests of the Portuguese and Spaniards in central and southern America, together with the commercial and religious settlements of the Dutch, French, and English in the northern half of the continent, will bring the geography of America to the front. This will prepare the way for a fuller understanding of the course of events in the struggle for supremacy between France and England and in the American War of Independence. From America the teaching will pass to Asia, India being considered in conjunction with the strife between the French and English for the possession of its trade. Australasia, Africa, China, and Japan remain as places of historic importance, a knowledge of the geography of which will be needed in following the further growth of the British Empire and the commercial rivalries of the modern world. The development of industry and commerce during the nineteenth century, due to the invention of steam power, will be a prominent feature of the course in history, and here will be a fitting opportunity to take a wider and deeper review of the industries and commerce of the British Isles than was possible in the third and fourth years. Such lessons will serve not only to revise and expand the pupils' knowledge of their own land, but to deepen and systematise their knowledge of the produce and industries of other countries. The nature and amount of our imports and exports should

be studied, and the countries from which we receive our food stuffs and raw material, and to which we import the products of our factories should be noted. The size and importance of our mercantile marine and the chief ocean routes and coaling stations should also be examined.

It must not be forgotten, however, that the course of history will bring certain countries many times into the foreground. Germany, Italy, the Balkan States, and Greece figure prominently in the growth of national spirit in the nineteenth century. France, Spain, Italy, the Rhine, and Russia were the theatre of the Napoleonic wars. Hence the pupils' knowledge of these countries will continually be growing fuller and fuller as the history advances. Complete geographical treatment of a country may not, therefore, always be necessary when it is first considered. The teacher should exercise his discretion as to how much he can leave to be dealt with when that country again figures prominently in the history. Obviously, however, there can be no perfect synchronising of the teaching of history and geography. The course in geography cannot diverge here and there as historic interest passes from country to country. Each country will as a rule be studied fully in its geographical aspect before another country is considered in detail, although at the same time a thorough treatment of the physical conditions and the people must take into account the connections and affinities that exist between them and the conditions and people of other parts of the continent.

The order of topics as outlined above is not laid down as a fixed and unalterable one. It is only offered as a suggestion to help the teacher in drawing up his own course. We wish only to emphasise the general principles on which such a course should be based, by illustrating how the details

might be worked out. In deciding on his course the teacher should consider with what fulness and with what emphasis he intends to trace out the movements in ancient, mediaeval, and modern history, and should arrange his course in geography accordingly.

General Treatment of a Continent.

8. The physical and human relations that bind country to country suggest that a rational study of Europe should begin by considering it as a whole. Similar reasonings apply to the study of every continent. The general build, the main mountain ranges, the chief river basins, the great plains, the large projecting peninsulas, should be learned in bold outline by the study of a model and photo-relief or orographic map. On the physical side, such outlining consists in noting the geographical areas and their boundaries. Human interest, however, must dwell on political areas and frontiers, and such questions as what constitutes a nation and what is a suitable frontier may well be discussed.

It will be found that racial characteristics, language, religion, and freedom of intercourse affect the answer to be given in each particular case; for example, great fertile plains and broad alluvial valleys tend to become occupied by the same nation. Organised governments rose on the fertile plains of the Nile, Ganges, and the rivers of China. Freedom of intercourse is necessary for cohesion. Dense forests and broad fens were impassable by wandering tribes and hence proved excellent frontiers. Mountain chains and arid plains were unfavourable both to warlike aggression and to peaceful intercourse, though gaps and passes gave possible, if not easy, access to merchants of neighbouring countries or to advancing armies. Such considerations as these should be dwelt on in marking out the different geographical and political areas, and the

progress of events in history will continually give opportunities for discussing them further. At the same time it must be noted that in all cases disturbing human forces will modify, to a greater or less extent, physical influences, so that political do not always coincide with natural frontiers.

Relation of Physical and Social Aspects.

9. In studying a continent or country in its physical aspect only those features that have, or have had, an influence in determining its political, social, commercial, or industrial fortunes need be dwelt on. This cannot be too strongly emphasised. No part of the brief time which the school can give to geography can be occupied with that which is simply and exclusively physical. What bears on human life as it is, or as it came to be what it is, inspires the deepest human interest, and is of the greatest human value.

It has already been noted that climate, vegetable and mineral resources, the nature of the mountains, rivers, and coast line are influences in the destinies of a people.

In Greece proximity to the civilisation of Egypt, together with a great extent of coast line and many good harbours aiding free maritime intercourse, favoured the advance of the Greek, whilst its numerous mountain ranges, by isolating its fertile valleys, hindered union into one nation.[1]

Italy and the Iberian peninsula, too, are examples of countries whose physical conditions tend to the formation of independent sections among the people. The great length of the former as compared with its width, and separation of the east from the west by the Apennines, hinder that complete solidarity of thought that is necessary

[1] The teacher is advised to read Chap. I., Part II., of Grote's *History of Greece*, where this subject is very thoroughly discussed.

for a strong national spirit. In the latter a similar result has been produced by a barren interior, numerous mountain chains, unnavigable rivers, and a coast line difficult of access; all of which have rendered peaceful intercourse and exchange of commodities and culture difficult in the extreme, the result being that there is no really national, but only local, feeling.

In France, on the other hand, the compact nature of the country, and the long, deep, navigable rivers that render every part accessible, have favoured the formation of a strong national spirit by union under one crown. At the same time its mountain and sea frontiers, except on the north-east, have hindered warlike aggression from neighbouring states.

The long narrow Mediterranean Sea with its numerous islands and projecting peninsulas, closed from the Atlantic and protected from its waves, has always been a busy highway for international intercourse. Phoenician and Greek traders were found in every land, and their colonies sprang up around its shores. The same sea made it easy for Rome to expand her influence over the countries on its borders. The importance of Alexandria is explained by its position at the mouth of the fertile valley of the Nile. This great city collected the wealth of Egypt and distributed it over the known world. Later, its position on the chief trade route to India made it the great emporium of the eastern Mediterranean, whence all goods were transported to and from the Red Sea. The presence of the sea accounted for the rise to wealth and power of the great cities of Venice, Florence, and Genoa. The discovery of the Cape route to India brought about the decline of Alexandria and of the great Italian cities, and the rise of maritime countries on the Atlantic seaboard.

In modern times steam power, electricity, and numerous

mechanical inventions are human agencies that, by overcoming time, space, and natural obstacles, make communication between country and country quick and easy. These agencies must be reckoned with in considering the growth and solidarity of the British Empire, and the development of the United States, Canada, Africa, and Australia.

Human Aspects of Geography.

10. In studying the peoples of the various countries a very complex problem awaits the teacher. The peoples of Western Europe, though no doubt marked each by its own peculiar characteristics, are in the main very similar to each other. The spread of Greek and Roman civilisation in all countries, the mixture of races, and freedom of intercourse have led to a common religion of Christianity, and a marked similarity in systems of government, in thought, art, and general culture. Advance in civilisation, of course, varies from country to country, but in comparison with the other peoples of the world the peoples of Western Europe, whether in their old homes or in new homes across the sea, present a type of life, thought, religion, morality, and social customs that mark them off from the rest of the world. There is little difficulty, therefore, in presenting them to the pupils.

Far different is it in picturing the peoples of the East, and the native races of America and Africa. Their religions, modes of thought, ideas of beauty and culture, their customs and habits of daily life are in striking contrast to those of Western Europe. A deep knowledge of racial characteristics, an intimate acquaintance with the details of their lives, are essential to the teacher if he is to present a vivid and real picture of these alien races. Generalities are vague and convey liitle meaning; too often they lead only to the memorising of formulas. To be fruitful they must

be clothed with a wealth of detailed knowledge that stirs the imagination and excites that feeling of sympathy which shows that the pupils have entered with mind and heart into the inner lives of these peoples. It is not enough to present pictures of appearance, dress, dwellings, and occupations, though these certainly should form part of the pupils' notion. An account should be given of beliefs and superstitions, of religious rites and ceremonies, of characteristic modes of thought, of the hereditary and national instincts which lead men to be warriors, hunters, or tillers of the soil. Representations of temples, sculpture, and other art work should be placed before the pupils in graphic detail.

In the national characteristics of a people much is due to the mixture of races resulting from the various invasions and migrations that, from time to time, have taken place. The pupils should know the chief racial peculiarities of Celt, Teuton, Arab, Slav, Turk, Mongol, and other peoples that overran or invaded Europe and Asia at various times. The course in history will set forth how they poured from time to time over the borders and conquered the occupiers of the soil. Sometimes the races blended, producing a people whose instincts savoured of both, as in many European countries. Sometimes the weaker succumbed and almost died out, as in the case of the native tribes of North America and Australia. Sometimes the two races lived on side by side, each people pursuing its own ideals in its own way. This is markedly exemplified in India, where many peoples with different languages, religions, and ways of life occupy the country but have never amalgamated into one nationality.

Whatever the final outcome of the many migrations recorded by history, each left some more or less distinct mark on the country. The invaders either built up or destroyed. Conquest has turned many fair and prosperous lands

into arid wastes of poverty. Asia Minor was a thickly populated province before its occupation by the Turks. Spain under the Romans was one of the granaries of the Empire, and under the Moors was the fairest land in Europe. With the Christian conquest "followed the abomination of desolation, the rule of the Inquisition, and the blackness of darkness in which Spain has been plunged ever since."[1] On the other hand, Roman occupation left its mark throughout its broad empire in cities, roads, harbours, cultivated lands, and in the language, customs, laws, and government of the people.

The names of mountains, rivers, and towns are striking evidence of the peoples who have governed or occupied the land. Such names as Paris and Turin mark the original tribes; Cadiz and Lisbon are signs of the maritime spirit of the Phoenicians. Indications in place names of the Roman occupation, invasions of the Northmen and of Arabs are too numerous to mention. The influence of the Dutch, French, and Spanish conquests in America can be seen from a glance of the map.

It is with such considerations as these that a country begins to mean something more than a tract of land. It is a book on which events have written their history in fertile fields and populous towns, in buildings, roads, harbours, and works of all kinds, in names of province and city. The pupils should be taught to read its story with sympathy and reverence.

Selection of Matter.

11. In presenting a continent or country and its people to the imagination of the pupils only the most important and main characteristics should be dwelt on. The vast extent of the subject and the limited time at the disposal of the teacher do not permit of minor peculiarities being mentioned.

[1] Lane Poole, *The Moors in Spain*. Preface, p. viii.

The depth and breadth with which any country is studied should depend on the importance of its relations to the great movements of history and to modern tendencies. India, as a part of our Empire and as the home of a typical Eastern civilisation, should be examined in careful detail; Persia, Siberia, and the republics of South America need only be sketched in broad outline.

Moreover, the aspect in which each country is examined should be decided by similar considerations. Except as the home of Greek civilisation and as an example of a nation freed from Turkish misrule, Greece has little importance. The Turkish conquest and the present political relations are the interesting questions in the Balkan peninsula. The early discoveries, the Dutch farmers, the natives, the gold fields, and British rule are the important topics in South Africa. Each country has its important aspect or aspects, has some features that are of vital moment. To know them fully, to understand them, to enter into the human problems with full sympathy is the work before the pupils. All else is irrelevant. To teach it is to waste time. Hence the teacher, in selecting the topics and in deciding the point of view from which they should be regarded, must weigh carefully each country in the balance.

Course in Physical Geography.

12. The geography during the later years of school life presents many very diverse phenomena in many parts of the world. Many different climates—cold, hot, moist, and dry, some equable and others extreme—will be under review. Flora and fauna, too, of very varied nature will be pictured. Mountainous regions, flat plains, broad alluvial valleys supporting huge populations, narrow rocky gorges hindering rather than aiding commercial and social intercourse, will be met with. So diversified and

numerous are the different kinds of physical conditions that aid or hinder man's daily work and social intercourse that to present them as separate concrete phenomena would lead to much confusion and would involve great labour in learning. Underlying each of the numerous physical conditions are a few main physiographical principles concerning climate, vegetation, and the formation of mountain and river that give unity and system to an enormous mass of detail. A knowledge of these principles is essential to the rational comprehension of the climate, vegetation, and surface of a country. Hence, when so great a complexity and variety of physical circumstances must be dealt with, it is most important that the pupils should become acquainted with these general notions in order that learning may be facilitated and time saved, and that they may perceive in such phenomena the working of certain fundamental natural forces.

Little can be done in this direction until the beginning of the fifth year. Until then the pupils are making some acquaintance with the details of comparatively small areas differing in physical peculiarities comparatively little from each other. But even during this earlier period the various physical conditions in the British Isles will, under a good teacher, have led the pupils to inquire into the probable cause of these variations. They should have been led to understand why Ireland is moist and Eastern England much drier, why the northern highlands are comparatively barren while the plain of York supports a large village and town population.

Relation to Main Course.

By the fifth year the pupils should have advanced sufficiently in breadth of knowledge and in intellectual power to profit by an organised course in important physiographical principles. This course should not be separated from the

main course in geography; it should be taught in connection with it and be largely determined by it in the order of topics.

The consideration of climate will come first as one of the most important influences on man's life. The effect of climate on vegetation and animal life will naturally follow. Monsoons need not be explained until India becomes the subject for study. Storms and hurricanes will be dealt with in connection with the West Indies and the Indian Ocean.

With the study of the Alps and Pyrenees can begin the teaching of the formation of mountains and the denuding action of glaciers and rivers. These will receive further consideration when the Himalayas and the Rockies are studied.

The formation of river valleys will be constantly under discussion. Broad alluvial valleys can be examined in the lessons on the Po, Nile, Ganges, and Mississippi, and narrow rocky gorges will be observed in teaching the rivers of Spain, the sources of the Brahmaputra and Indus, and the cañons of the Colorado.

In this way an intimate connection will be maintained between physiographical principles and geographical phenomena; the former will constantly be applied in explaining the various geographical facts met with as the pupils pass from country to country and from continent to continent.

Climate and Vegetation.

From the early course on geography and from general information which will have been gained from time to time about the countries from which various articles such as tea and cotton are brought, the pupils will have acquired a considerable body of knowledge with regard to climate. They will know there are countries hotter and colder than their

own, countries drier and wetter, countries which have warmer summers but colder winters. By an analysis of this knowledge they should reach a rough classification of the various kinds of climates, and from this should pass on to determine the causes that produce these variations. They will consider how latitude, altitude, mountains, winds, vast expanses of water and land, ocean currents, have each its influence in determining the degree of warmth, moisture, and equableness of the climate of a country. Isothermal charts of the world for January and July should be examined, and the pupils should show their grasp of the conditions that make for and against heat and cold by explaining the variations in the direction of the isotherms as they pass over continents and seas, over low plains and valleys, and over mountainous regions. Rain charts of the world should be similarly studied. Many illustrations of climates in different parts of the world should be given during this teaching to help the pupils to attain a thorough grasp of climatic conditions, but the real application of the principles will come when they begin the first study of a country. Each country will then present a fresh opportunity for gaining a more detailed and clearer grasp of the subject.

The influence of climate on vegetation should next be considered, and should lead up to a knowledge of the zones of vegetation and the kind of vegetation peculiar to each. Temperature and moisture will be shown to be the main factors in determining the amount and kind of vegetation. The effect of temperature is well illustrated by the change in vegetation in passing from the equator to the poles or in ascending mountains of considerable height, and the influence of moisture by comparing such arid lands as the Sahara, Arabia, and the Spanish plateau

with the tropical forests of Africa and America. Scenes typical of each zone should be graphically described and amply illustrated by pictures and, where possible, by specimens of plants. Such typical regions as a tropical forest, an arid waste, the Mediterranean area, a pine and fir region, should be described. Man's efforts to overcome natural difficulties by irrigation should be dealt with and illustrated by reference to such countries as Spain, Egypt, and India. So will the pupils be aided to picture realistically the characteristic vegetation of the various zones.

A thorough study of climate demands a treatment of winds and currents; of atmospheric moisture and the conditions which make for and against its condensation; and of the rotation and revolution of the earth, their results in the succession of seasons and the variation in the length of day and night, and their influence on the directions of winds and currents.

The two former will require lessons of an experimental character. Expansion and contraction of liquids and gases by heat and cold, convection in air and water, evaporation and condensation should be illustrated by suitable apparatus, and the principles so demonstrated applied to the wider and more complex conditions on the surface of the earth. A very common mistake in teaching such topics is the statement that "heated air or water rises." Such is not the case, unless it be in dynamical relations with a heavier substance, as cold air or water. It is the colder air that forces the relatively lighter heated air upwards. Another common but erroneous statement is that "moist air striking on cold mountains causes rain." The real sequence—that mountains deflect the current of air into higher and colder strata of air and that condensation ensues—is one the pupils are quite capable of inferring.

In teaching the rotation and revolution of the earth the various relevant facts known to the pupils should be gathered together and summarised in a convenient form. They will know that the length of the day and night varies during the year, and which is the longest and which the shortest day. They will know the difference of the seasons. Such facts clearly and briefly summarised will keep before their minds the phenomena they have to explain. No attempt should be made to pursue a strictly inductive method. This is out of place with children in so complex a subject. It is far better to lay clearly before them the main relations of rotation, inclination of axis, and revolution. There are many opportunities, however, when a tactful teacher may call on his pupils to suggest hypotheses, and in such cases they should infer the consequences of these suppositions and so expose their truth or falsity.

When the relations of rotation, inclination of axis, and revolution are clearly grasped the pupils should work out in detail their consequences in varying length of day and night and in the seasons—knowledge which can then be applied to securing a deeper grasp of the climatic conditions in various typical parts of the globe. Later they should pass on to explaining the Phases of the Moon and Eclipses, and should, before leaving school, have a clear general notion of the Solar System. Considerable interest will be excited by pointing out, on some starlight night, the most important constellations, giving their names and some interesting particulars concerning them.

To obtain a clear grasp of the relations between the earth, sun, and moon, and to work out one by one the consequences of these relations, a good model, illustrative of the movements of rotation and revolution, is necessary. It should be strongly and firmly made, simple in character,

have no complicated machinery, and be capable of being handled and worked by the pupils themselves.[1]

In studying mountains and rivers the pupils should begin to understand the nature of the earth's crust, the main kinds of rocks that compose it, and the chief characteristics of those rocks as far as they affect man. The movements of the earth's crust, volcanic action, and the formation of mountain chains should be illustrated by diagrams and models, and by reference to specimens of rocks and photographs and sketches of exposed strata. A simple way of illustrating the movements of the crust is to take a pile of papers differently coloured to represent strata, then holding the ends fairly firmly to apply lateral pressure. The pile of stratified papers will crumple up in a form very analogous to the movements of the earth's crust in forming mountain chains. The action of frost, wind, rivers, glaciers, and seas in moulding the surface of the earth should then be examined, and will receive ample illustration as the pupils pass from country to country. Pictures, photographs, lantern slides, diagrams, and sketches should be used extensively in illustrating the results of denudation.

Detailed Illustration: Iberian Peninsula.

13. To illustrate the application of the above principles in the choice and grouping of topics, we propose considering how the land and people of the Iberian peninsula might suitably be presented to the pupils.

It must be remembered that the general build of Europe will be known, and that some progress will have been made in considering climate and vegetation. Greece and

[1] Two such pieces of apparatus have been designed by Messrs. Wyles and Lang, and have been used in many schools with very satisfactory results. They can be obtained from Messrs. Arnold, of Leeds.

Italy at least will have been studied, and examples of Mediterranean climate and vegetation illustrated. In dealing with Italy the effect of the snow-topped Alps and of the heavy rains among these mountains and the Apennines on the delta and alluvial valley of the Po will have been examined. Moreover, Spain will appear prominently in certain parts of the course in history, particularly in dealing with the Moorish invasion, the Spanish conquests in America, and the Peninsula wars. Hence, topics with a strong historical bias that bear prominently on these periods can well be left for full consideration to the lessons in history dealing with these questions.

The position of the Peninsula, its comparative isolation from the rest of Europe, and its compact shape will first be considered as fitting it to be the home of a single nation, though other of its features will afterwards be found to have an opposite tendency. Its build, when examined from a model or photo-relief map, will be seen to consist of a large high tableland bordered and intersected by ranges of mountains, with fringing coast plains of varying width on the eastern, southern, and western borders, and two broad depressions of the Ebro and the Guadalquiver; the one separating the plateau from the lofty range of the Pyrenees on the north-east, the other from the high peaks of the Sierra Nevada on the south.

The solid, compact nature of the tableland in proximity to the sea in many places will explain the general lack of inlets except in the north-west, where the numerous mountain ridges abutting on the coast give rise to the 'rias' of Galicia. Such a coast line suggests that harbours will be few and the coast difficult of access; consequently, that the Spaniards will show little propensity for maritime

adventure: a conclusion which the teacher will bear out by informing the pupils of the smallness of the Spanish mercantile marine. By studying a map of the Peninsula it will be seen that the chief harbours, especially on the west coast, are found at the mouths of rivers; and reference will be made to Lisbon, one of the finest harbours of the world, and Oporto, the port *par excellence* of the Romans. That these ports are in Portugal and that the Portuguese have an inveterate dislike to the Spaniards, point to the conclusion that the Portuguese will seek commercial intercourse with other nationalities by sea and will have strong maritime tendencies. These inferences the teacher will support by references to Portuguese history. Prince Henry the Navigator, son of John I. of Portugal, was one of the earliest leaders of maritime discovery. By his efforts the Portuguese succeeded in discovering the Azores and the Madeiras, and in finding their way round the Cape to India, a beginning that culminated in a vast colonial empire spreading from Brazil to India. A fitting comparison may be drawn in this respect between Spain and the Spaniards and Greece and the Greeks.

Passing to the river system the pupils will infer, by noting the course of the rivers, that the general fall of the land of the plateau is from east to west. Thus most of the drainage of the plateau is westward, and the rivers of the north and east, where the plateau or the fringing mountains lie close to the coast, are short and rapid, and, consequently, of little or no use for navigation. As the plateau is fringed by mountain ranges the rivers have to burst their way through, and have formed deep, narrow, winding gorges, two of which, the passes of the Douro and Guadiana, provide the main lines of communication between the plains and the tableland; the third, the passage of the Tagus, is too difficult to be of much service.

Before considering in full the effect of the rivers in aiding or hindering commercial intercourse and political unity, it will be advisable to examine the climate of Spain and its effects on the land, since the obstacles of contour are further intensified by the results of the climate. The climate, or rather climates, of Spain are the direct result of its position and build. Lying practically in the same latitude as Southern Italy and Greece, it possesses a much drier and more extreme climate.

This conclusion the pupils can infer by applying their knowledge of climatic conditions to the position and build of Spain. The great plateau with its fringing mountains is in reality a great uplifted depression or saucer, or rather series of saucers, separated by intersecting ranges. In summer the plateau is intensely heated and the air consequently rarified; hence the general direction of the winds will be from the sea to the interior. In winter the land is cooled and the air condensed, and the winds will be from the interior to the sea. In summer, however, when the winds are heavily charged with moisture from the Atlantic and the Mediterranean, the rain is deposited on the slopes of the mountains fringing the plateau, leaving the inner area a waterless desert, whilst the slopes towards the seas are well watered. In winter the climate will be dry and extremely cold.

To bring out in a realistic manner the contrasts between the various districts in Spain, certain typical areas should be described in some detail and illustrated by pictures. The pupils should imagine the arid plateau, its scanty vegetation mostly of esparto grass, its numerous bare tracts, the scorching heat and glare of the sun, the cloudless sky, the cool and sometimes chilly evenings, the Spanish houses, the midday siesta, the dry choking dust that obscures the landscape in the south and through which the sun shines

only as a reddish disc, the caravan of mules indicated in the distance by the gray cloud of dust, and in winter the cold, dry, piercing winds and the snows of the mountain passes. It will be pointed out how this region was not always a barren waste. By irrigation and skilful cultivation the Romans made it one of the granaries of the world, and the agricultural genius of the Moors enriched it still further. The modern Spaniard, however, indolent, apathetic, with rude antiquated methods of tillage, leaves it the desert waste it is to-day. The teacher should explain, and illustrate by means of diagrams, methods of irrigation by which a scanty water supply may be collected, preserved, and distributed, so that the utmost benefit is derived from it.

In contrast with the waste and arid plateau the more flourishing regions round the coast should be pictured.

On the northern coast, owing to the rain-bearing sea winds depositing their moisture on the slopes of the Cantabrian mountains, the country wears a perennial garment of green. The teacher should describe the forests of oak, beech, and birch, the orchards of apples and cherries, the groves of chestnuts and walnuts, the fields of maize, rye, hemp, and flax, the green mountain glens, and the rushing streams.

In Valencia a different scene presents itself. The warm climate and the irrigation works left by the Moors have made it a veritable garden. Oranges, dates, figs, almonds, raisins, olives, pomegranates, lemons, mulberries, tomatoes, and fields of maize, wheat, flax, hemp, cotton, and, near the low-lying coast, sugar are found. So rich is the soil that two or three crops a year can be gathered.

Similarly, Andalusia, with its varied wealth of products —tropical, sub-tropical, and temperate—and its fierce hot summer, should be described.

The contrasts may well be brought out by the teacher reading such a passage as the following:—"If in summer you were to cross the peninsula from the Bay of Biscay to the south coast of Andalusia, you would climb up to the tableland from a region where everything rusts and moulds from dampness, ascending through fields of maize, through vineyards, through orchards of apples and pears, through groves of chestnuts, forests of oaks and beeches, past green meadows and brawling mountain streams. Up on the tableland all is aridity and fierce sun heat, with no sign of life anywhere. What little vegetation there is, is smothered with dust; dust chokes the roads, the houses; dust fills the air, dims the brightness of the sun. Wide treeless plains separated from one another by bare, stony mountains. But the tableland crossed, and the blue waters of the Mediterranean seen sparkling in the distance, you enter a land where the mountain brooks conjure forth groves and gardens of lovely fruit, where the golden orange gleams amongst its dark green leaves, and the date-palm lifts its noble crown of foliage high above the Moorish-looking town, and close down by the sea fields of sugar-cane wave gently in the breeze."[1]

The pupils can now, from their knowledge of the resources and difficulties of communication in the Peninsula, readily come to several important conclusions. They will see that the rivers, both from the rocky nature of their gorges and from their scant supply of water, are quite unserviceable; that the mountains, meagre rainfall, and the scarcity of vegetation render political combination, commercial and social intercourse and military campaigns very difficult; that only by energy, initiative, skill, and persevering enterprise in making roads, railways, and irrigation

[1] Quoted from Fischer, in Stanford's *Compendium of Geography, Europe*, Vol. I., p. 281.

works, and in introducing improved methods of tillage, can the natural difficulties be overcome and the country be rendered prosperous. These conclusions should be illustrated in a number of ways.

The main facts of the campaigns of Napoleon and his generals in Spain will exemplify the difficulty with which warfare in such a country was conducted. The lack of water and vegetable life prevented continued concentration of troops. Armies had to be scattered over the country. Their routes were determined by the passes over the mountains; and the passes of the Douro and the Guadiana and the places that guard their entrance were the continual scene of Wellington's various marches, whilst only once did he attempt the difficult passage of the Tagus. The impracticability of the mountain passes in winter, due to the wild snowstorms, is well illustrated by the account of Sir John Moore's retreat on Corunna.

The nature of the land and the climate account, too, for the tendencies which have always marked the people of the Peninsula. The various races have never really combined into one nation. In different districts they have different dialects and very divergent racial characteristics. Thus, Spain is seen, not as a united people whose national aims and aspirations centre in its capital, but as a collection of states, weakened by local jealousies and feuds and always ready to rebel against the central authority. With such centrifugal tendencies it is easy to understand how conquest by the Moors was aided by disunion between the Goths and native races, and how in turn dissensions among the Moors helped the Christian power to expel them from the land. Illustrations of these tendencies to disunion are found throughout the whole course of Spanish history. In the absence of a real and strong national spirit, to subdue and conquer the capital

city meant nothing; local resistance and independence asserted themselves quite as strongly against an enemy though he held the reins of government. The rising against Napoleon was not a national movement, but a number of separate local movements. Each province acted independently. In this respect Spain may very aptly be compared with Greece and Italy, where similar tendencies were shown.

The difficulties of commercial intercourse will explain to some extent the uncommercial spirit of the Spaniards, their local independence and proud nature, the ignorance and conservatism of the peasant, the clumsy antiquated method of cultivation, and the poverty of the country.

The pupils will now be able to appreciate more fully the characteristics of the Spanish people. They will see that just as the country is full of contrasts so are the people. The teacher will describe in detail the gay, pleasing, courteous, yet self-satisfied Andalusian; the proud, ceremonious, opinionated, but indolent Castilian, content to while away his life in abject poverty; the more enterprising and industrious inhabitants of the north coast—the Galician, who undertakes all kind of arduous labour, the Asturian, who prefers domestic service, the Basque, proud as the Castilian, but devoting his energies to farming and rural occupations; the revengeful, suspicious, and bloodthirsty Catalonian and Valencian. They will thus be prepared to realise that the dominant notes of a large section of the Spanish people are indolence, apathy, and self-satisfied pride.

These characteristic traits can be well illustrated by reference to the use the Spaniards make of their mineral and agricultural resources. Their rich mines of argentiferous lead, copper, and iron have always been exploited by foreigners. The Phoenicians, Romans, and Moors worked them in the

days of old. After the expulsion of the Moors the mines were neglected until the nineteenth century, when the industry has been revived by French, German, and English enterprise. Spanish indolence, ignorance, and apathy in agriculture are shown by contrast with the skill and energy of the Romans and Moors. The antiquated methods of cultivation should be described—wooden ploughs drawn by oxen, sickles to reap the corn, threshing under the feet of horses, winnowing by the wind, and other rude methods of tillage.[1]

Enough detail has, perhaps, been given to indicate how the connection between physical conditions, the life of the people, and historical events should be emphasised in teaching geography. Before the Peninsula can be left there yet remain to be taught the particulars of each district. The Pyrenees, with its passes and great 'cirques,' will be pictured, and Roncesvalles and the paladin Roland mentioned. Andalusia and the Moorish cities of Cordova, Granada, and Seville will be described, and something of the wonders of Moorish culture and industry presented to the pupils, though fuller treatment will be left to the course in history.

As opportunity presents itself the history seen in the names of mountain, stream, and city will be touched on. The Moorish 'gebel,' a mountain, and 'guad,' a river, will constantly receive illustration, and Tarifa and Gibraltar bring to remembrance the early Saracen invaders.

Form of Teaching.

14. From the account that has been given of the kind of geography that should be taught it will be obvious that, besides giving the pupils a rational understanding of the lands and peoples of the world, a real and vivid picture of them

[1] The disastrous effects of Spanish indolence may be made vivid to the pupils by reading to them such a passage as the first two paragraphs of Mr. Lane Poole's *Moors in Spain*.

must be presented—a picture that stands before the mind's eye in living detail. Indeed, a rational understanding is only possible when such an image is created. To present such a picture the teacher needs a copious and detailed knowledge. This cannot be obtained from a text-book, which confines itself to lists of names and detached statements of facts. To obtain the abundant and graphic detail that is essential to effective teaching, books that describe the lands and peoples in warm and living colours should be studied. Books written by observant and sympathetic travellers or by those whom long residence has made intimately acquainted with the inner lives of the people are especially valuable. Many extracts from such books can with advantage be read to the class, and will probably awaken an interest that will lead the pupils to seek further acquaintance.

Description.

Having made himself thoroughly at home with his matter the teacher must present it in such a way as to arouse the pupil's imagination. Every means possible should be used to effect this end. Abstract statements of general notions are never effective. Such notions should be inferred from facts gathered from the map or from information supplied by the teacher or book. They are, however, only an outline sketch which, as detail after detail is added, should become a vivid and realistic picture.

For example, to tell the pupils or to lead them to infer from certain data that certain parts of Canada have an extremely cold winter is to state a general fact which may mean much or little according as they can realise in imagination what this means to the Canadians themselves; and the average English child has very little material from which to construct such a picture unaided. The teacher should, therefore, describe the St. Lawrence frozen over

with ice and the railway laid across, the furs and wraps to keep out the keen wind, the sleighing and tobogganing, the snow-shoes of the hunter. Then, if he reads to them such a poem as *The Famine* from Longfellow's *Hiawatha*, their imagination and sympathies will be aroused in such a way that they will feel as well as know what "an extremely cold winter" means. Yet, as the pupils advance, inference from general principles and fuller and deeper explanation should mark the learning; for it is essential that they should understand the underlying connections between things.

Though graphic and detailed, the descriptions should be clear and orderly, or they will only result in a confused blur. In describing a scene the teacher should start from an outline sketch of the whole and fill it up methodically by passing from one point to another in order of importance, dwelling explicitly on the connections that bind them together into a whole. Many descriptions, though good in the graphic and realistic nature of their details, fail because the teacher, instead of putting the pieces together systematically, jumbles them up in a confused heap.

Text-Books and Reading-Books.

During the early years the descriptive oral lesson will have been the chief mode of teaching. Now, however, that the pupils have acquired the art of reading with ease, books should more and more become the instruments of learning. A good text-book is necessary which will give in an orderly manner the facts of geography, and show by the grouping the relations between the facts. To supplement the text-book and to give a fuller and wider treatment of the chief topics of interest a reading-book of geography should be used. This should contain suitable extracts from such works as have already been recommended for the

teacher's own reading.[1] The class library, too, should contain a number of good books on geography and travel to which the pupils should be referred, and opportunities should be given them to study such books in school and to make notes on what they read.

Pictures, Sketches, etc.

Descriptions should be supplemented by pictures, sketches, diagrams, models, and specimens. Geography cannot be taught successfully without pictures. The pictures should either be presented as lantern slides or should be large enough to be examined by the whole class. At the same time smaller pictures, such as can be cut from illustrated papers, are not to be despised. The pupils should be encouraged to collect these and bring them to school. They can examine them one by one after the lesson or in their leisure time.

Sketching on the blackboard is an art which every teacher should acquire. By placing rapidly on the board a bold, striking outline he can draw the pupils' attention to just those essentials and details that he wishes to emphasise. Such an outline sketch is frequently of more value than an elaborate picture giving a host of unessential details that only obscure the main point. It has the further advantage of being sufficiently simple to be copied by the pupils in their note-books. The same remarks apply to diagrams and models. They should be plain and simple in structure so as to represent clearly the ideas they illustrate.

Specimens of products, of material in various stages of manufacture, of rocks, and fossils are valuable means of adding interest and value to the teaching. They should

[1] Such books as the *Descriptive Geographies from Original Sources* and *Man and his Work*, published by Messrs. A. and C. Black, are interesting and suitable.

be displayed in a museum in some definite and systematic order. Each specimen should have a label attached stating what it is, whence it comes, for what it is used, and its chief characteristics. The pupils then in their leisure time can examine the museum with profit.

Maps.

Maps hold an important place in the teaching of geography. Two forms of maps should be in constant use: photo-relief or orographic maps which, by means of shading or colouring, will indicate the contour of a country and from which the physical features can be studied, and sketch-maps drawn by the teacher on the blackboard or on black canvas. The latter should be filled in as the teaching progresses, so that they will contain only those features and names which the teacher wishes the pupils to memorise. Each will thus be a summary. More than one sketch-map of a country may be required, as besides physical features and towns, coal fields, industrial and agricultural areas should be marked by shading in coloured chalks.

Each pupil should have a blank map on which, as the lesson proceeds, he should mark the features and names taught. Then at the end of the lesson he will have a partial summary of the matter taught. Such a map should be drawn in his note-book so that it can be preserved for purposes of revision and memorising. An excellent way of securing revision and memorising of the main outlines of the geography of a country is to require the pupils to sketch boldly and quickly from memory a map of the country, showing the main features and towns, and indicating by various devices the industrial, mining, and agricultural centres. Such a map drawn rapidly, yet accurately as to broad outline, is of far greater value than a careful and neat coloured production over which hours may have been most unprofitably spent. Before asking the pupils

to draw such a map from memory the teacher should give them an opportunity of learning it. They should grasp clearly the prominent divisions and features of the country in relation to each other. As a rule, the river basins, with the mountains around them, are good centres to start from.

For example, in memorising the map of France, the four main river basins, with the general direction and relative position of the rivers, should first be noted. Dijon is a good centre on which to fix the eye in the comparison. It will be seen that Havre, Nantes, Bordeaux, Marseilles are, roughly speaking, about equal distances from Dijon; that the general direction of three of the rivers from this point is respectively north-west, west, and south, and that the direction of the fourth—the Garonne—is in the main parallel to that of the Seine. The rivers being thus located, the positions of the mountains should be grasped in connection with them. The relative position of these features having been fixed the pupils should study the line of longitude 2° E. By means of this line the positions of Dunkirk, Calais, Amiens, Paris, Orleans, Limoges, Toulouse, and the eastern end of the Pyrenees can be remembered. Cherbourg, Nantes, Bayonne will be seen, roughly speaking, to lie on another line by which the projecting peninsula of Brittany, the 'sleeve' of Normandy and the west coast of France can be marked. The coast line and land frontier can then be roughly sketched in bold outline only, so as simply to suggest the main contour of the land and sea frontier. The pupils should draw the map in the order outlined above, and endeavour to fix the main features and their relative positions firmly in their minds by means of the devices suggested. Certainly not longer than ten minutes should be taken for this sketch. A second drawing from memory, assisted by observation when memory fails, should not occupy so long a time. A third sketch

entirely from memory should complete the learning within half an hour. Such drawing is a most valuable means of memorising the main features of a country.

Each pupil should have a good atlas, and be taught how to use it.[1] Sometimes it is well to make the first lesson on a country the study of the map, and to discover what can be learnt from the map alone. Atlases and blank sketch-maps should always be used when the pupils are studying from text-books or reading-books in history or geography.

Memorising.

Finally, memorising must not be forgotten. The drawing of sketch-maps both during and after the teaching will aid in this, yet there is much information that cannot be summarised and learnt in this way. Such information should be retained by the pupil in the form of brief concise notes, yet full enough to contain the main outline. At first such a summary will be placed on the blackboard by the teacher as the lesson progresses. In the later years the pupils should be trained to take notes of their own which, combined with the leading headings placed on the board by the teacher, will serve for them to make a more complete outline summary for permanent retention. Summaries of the chapters read from the reading-books should also be made. These summaries and notes are most conveniently written on pages facing the sketch-maps illustrative of the points to which they refer. All such notes should be thoroughly memorised, and the pupils should not infrequently be required to write essays or to answer questions in writing on the work thus learnt.

[1] Such atlases as the *Model Atlas* and the *Elementary Atlas of Comparative Geography*, published by Messrs. Philip, contain useful maps showing contour by shading or colours. These may be supplemented by orographic sheet-maps of the most important countries. (Diagram Series, from one penny each.)

The following books are recommended to the teacher :—

On Historical Geography:

See the books recommended at the end of the chapter on History, p. 275.

On the Subject-Matter of Geography:

Mackinder (Editor): Regions of the World Series ... ... each	7/6 (Heinemann).
Mill: The International Geography ...	15/- (Newnes).
Stanford's Compendium of Geography, 12 vols. ... ... each	15/- (Stanford).
Mill: Hints to Teachers and Students on the Choice of Geographical Books	3/6 (Longmans).
Highways and Byways Series ... each	4/6 (Macmillan).
Herbertson: Descriptive Geographies of the World, 6 vols. ... ... each	2/6 (A. and C. Black).
Andrews and Herbertson: The Geographical Teacher	5/- per annum (Philip).

(A magazine published under the auspices of the Geographical Association, issued three times a year.)

Catalogue of the Geographical Exhibition	6d. (Philip).

(Supplement to Vol. II. of The Geographical Teacher.)

Herbertson: Man and His Work ...	1/6 (A. and C. Black).
Herbertson: Outlines of Physiography	4/6 (E. Arnold).
Huxley: Physiography	6/- (Macmillan).
Jarr: Elementary Physical Geography	7/6 (Macmillan).

Maps and Atlases:

Debes: Neuer Handatlas	30/- (Leipzig, Wagner and Debes).
Andrews and Dickinson: Diagram Hand Atlas	3/- (Philip).
Bartholomew: Orographical Maps, each	1/- (Bartholomew).
Smith, Moss, and Rankin: Geographical Distribution of Vegetation in Yorkshire, Parts I. and II. ... each	1/6 (Bartholomew).

CHAPTER XII.

THE TEACHING OF NATURAL HISTORY.[1]

Meaning of Nature Study or Natural History.

1. Nature Study is a new name for an old subject. Our grandfathers called it natural history; and this subject, in their day, included a knowledge of animals, plants, and rocks. After a time, the study of rocks was dissociated from that of living things, and our fathers then studied geology or biology. The biologists clung to the old name, and still spoke of their subject as natural history and of themselves as naturalists. Still later the process of specialisation was carried a stage further, and the study of animals became distinct from that of plants; so that to-day there are many zoologists and many botanists, but few biologists. The zoologists of to-day often reserve to themselves the title of naturalists, even when their study is almost confined to a single group of animals, such as birds, or insects, or butterflies and moths. In this chapter we shall use the term natural history in its old-fashioned sense, and the term nature study as synonymous with natural history as it should be taught in schools. It must be borne in mind, however, that one aspect of the general subject is treated in the chapter on geography.

[1] By C. E. Moss, M.Sc.

Natural History in Schools.

Natural history, whichever of its meanings be attached to the term, is not a subject which has been generally taught in the primary schools of this country; consequently there exists but little tradition as to how the subject should or should not be taught. Not infrequently, however, enthusiastic naturalists who were schoolmasters by vocation introduced the subject, in a more or less informal manner, into their own schools. Such teachers, being full of enthusiasm, and having a thorough knowledge of the subject, did excellent work in nature study, even before the latter term was invented. In so far as there is any tradition at all with regard to nature study, that is, natural history as a school subject, the tradition is due to these schoolmaster naturalists, who regarded the subject as largely an out of door subject concerned with the common objects of the country side, and this tradition is worthy of all respect.

Nature Study and Object Lessons.

Object lessons, however, have long been given in many primary schools. In 1899, when such lessons were regarded as one of the 'class subjects,' 95 per cent. of the schools which took class subjects presented object lessons. It has been usual to include in the lists of such lessons some whose titles at least had relation to natural history. Only when object lessons deal with common natural objects, and when the lessons are illustrated by the actual objects themselves, may the subject be regarded as having any definite relation to nature study. Object lessons in the past have been of little worth as instruments of education through the neglect of these two principles. Instead of lessons on blackbirds and bluebells, attempts were made to give lessons on the giraffe and the sago-palm; and though the lessons were described as object

lessons, they were frequently given without illustrative objects, and thus were not, in any real sense, object lessons at all, for neither diagrams nor models are effective as substitutes for the actual objects.

Inherent Defects of Object Lessons.

The above weaknesses of object lessons are to some extent remediable, but there is another weakness which is inherent. Object lessons are, of necessity, more or less disconnected one with another. This is palpably the case in the lists of subjects of object lessons which are found in most schools, where a lesson on india-rubber may be preceded by one on a glacier and succeeded by one on coal. It is to some extent the case in any list of object lessons which may be drawn up. Lessons on objects merely can scarcely be other than detached one from another, can scarcely be framed on general principles, and, therefore, can scarcely ever lead to any definite result. By their nature they degenerate into lessons in which the teacher imparts miscellaneous items of general information, which the children are expected to remember. Consequently the lessons are often tedious, formal, and dull: interest is rarely aroused; and there is little or no call on the pupils' powers of observation and construction.

Subject Matter of Nature Study.

In nature lessons the objects to be studied are such as come under the frequent observation of the pupils. Common plants, common birds, common insects, provide excellent material for classes engaged in nature study. The pupils should, for example, be taught how to identify, at any season of the year, the common trees of the district. This entails a knowledge of their bark, twigs, buds, leaves, flowers, fruits, seeds, and seedlings. The common song birds should be known not only by their songs and plumage, but to some extent by their methods of flight—

whether undulating or direct, and by their motion when on the ground—whether they hop or walk. A few winter migrants should be known, more summer migrants, and a still greater number of the birds which are resident in the district all the year round.

The commonest butterflies should be studied. They should be known by their colours and to some extent by their positions when at rest. The time of their first appearance during the year should be noted, whether or not they disappear long before the summer is over, and, if so, whether they reappear during the autumn. The pupils should find out on which plants the eggs are laid, and on which the caterpillars feed. Then the rest of their life histories may be followed indoors. The habitats of the common flowers should be discovered, and eventually the pupils should be able to predict whether a given district is a likely one for, say, bluebells, cowslips, foxgloves, or heather. The facts and principles governing the respiration and the food of plants and animals may be studied even in the lower years; and in the intermediate and upper years the elements generally of the physiology of plants and animals should furnish material for experimental work.

The Scope of Nature Study.

Nature study is neither botany, nor zoology, nor geology, nor any branch of these sciences, nor any possible combination of them, though its subject-matter is largely the subject-matter of these sciences. It is scarcely possible, and it is certainly not desirable, to fix the precise limits of what is included under the term 'Nature Study.' In its widest sense, it is the attempt to find out for oneself all that one can about common natural objects and common natural phenomena. It therefore concerns itself with the simple facts of zoology, botany, and physical geography, though the formal study

of these sciences is beyond its range. The purely technical terms may, and should, usually be avoided and ignored. A course of lessons in nature study is not to be found in a list of miscellaneous subjects, but should consist in the statement of a few simple problems. The actual lessons should be concerned with finding the solutions of these problems. It is right that individual teachers with preferences for particular aspects of nature study should give prominence to their favourite points of view; but in all cases the lessons should cover a wide field, and should at least include lessons on flowers, seeds, insects, and birds.

Functions of Nature Study—a Right Relation to the Natural World.

2. Nature study brings the child into his right relation with the objective world which surrounds him. It increases his powers of perception and expression. It develops his activities. It trains his mind. It teaches him ultimately his own place in the scheme of nature. It widens his outlook on things, and enables him to live a fuller and a brighter life. It enables him to see things as they really are, and to comprehend their true significance. It kindles or stimulates a desire to know more of what he sees, and culminates in a keen interest in all natural objects and phenomena. The seeing eye, the hearing ear, and the understanding heart are rare possessions. It is the chief object of nature study to train children in such a way that they will become possessed of these gifts and retain them through life.

Love of the Country.

Nature study is not successful unless it arouses an interest in, and so leads to a knowledge of, the country side. The feelings of wonder and delight which an ordinary man experiences when he takes a country ramble in company with a true naturalist—one who studies things, not merely the names

of things—is a measure of the gain to be expected from the study of nature, and a measure of the loss at present sustained through its neglect. Children in rural districts, when they leave school, should be in sympathy with their surroundings, and should be willing to take an intelligent interest in rural pursuits. Suburban and town children also should have developed such an interest in nature that, though their vocations may compel them to spend much of their time amid the turmoil of city life, they will yet visit the streams and woods and hills of the country as often as their circumstances permit. Nature study is a strong and a safe antidote against the shallowness and the sensationalism of modern city life.

A Foundation for Science Teaching.

Nature study lends itself to the inculcation of scientific method by the exact observation, description, and comparison of easily ascertained facts, and by the solution of simple problems suggested by those facts. It is not the study of any of the specific sciences, yet it provides a sure foundation for such subjects should they be studied in later years. Many of the best teachers of science have now formed the opinion that the teaching of specific sciences to children of less than fifteen years of age is, and must be, a failure, that the huge amounts of money which have in recent years been spent on laboratories, equipment, and salaries for this branch of teaching have been a waste of public funds, and that all such teaching should be replaced by some form of nature work. The development of habits of observation, description, and carefully guarded inference by nature work fits a youth for a sound course of instruction in the specific sciences far better than the committing to memory of ill digested facts and theories of botany, physics, or chemistry.

Not only is nature study of direct benefit to those children who will later in life study the sciences, it is also a necessity for a greater number who will have neither the desire nor the opportunity to become students of these subjects. The literature of a country can never be fully appreciated by those who are ignorant of nature, her ways, and her moods. Almost all our great writers, whether of prose or of poetry, have been students of nature: a few, who have not been such, have pretended to be: none has contemned nature. It is surely as important for British students to appreciate the references of these writers to the country side of their own land as to understand their allusions to Greek mythology.

An Aid to Literature.

It has been held that nature study has a moral aspect, and the teacher should constantly have this point of view in his mind. It is, however, unwise to put this aspect before young pupils. Long years of communion with nature may develop a Wordsworth or a Richard Jeffries, but it may be questioned whether this desirable consummation is to be reached by sermons, even when they are disguised in stones or flowers or birds. The teacher will have no lack of opportunities for arousing in his pupils a love of nature. He will not need to seek occasions for inculcating such desirable virtues as kindness to animals. Good intentions on the teacher's part to inculcate moral instruction through nature study should always be subconscious in his mind, but they need be but rarely expressed. Above all, any affectation on the matter should be suppressed, both by teacher and pupil. A healthy love of nature is never obtrusive. Advertisement in this regard savours of hypocrisy, and at best will only form the prig.

Ethical Value.

3. The method of teaching should be observational, descriptive, comparative, and experimental; and easy

inferences and simple general conclusions should be drawn from the observations and experiments. The observations, descriptions, comparisons, experiments, and deductions should be made by the pupils themselves. The teacher should only guide the efforts of his pupils: he should, as a rule, neither supply the information nor perform the experiments. An information lesson is not a nature lesson. In the former the teacher does the bulk of the work: in the latter the work is performed by the pupils, who act under the teacher's directions. In a good nature lesson each pupil handles objects, examines them, draws them, performs experiments with them, and finds out something about them. There can be little doubt that this method of teaching the subject is easily practicable in rural and suburban schools, provided only that the teacher is in sympathy with the purpose of nature study.

General Method of Teaching.

Nature study makes school life more palatable to children. It is found by experience that while few classes are ever roused to enthusiasm by grinding at the English system of weights and measures or at the intricacies of English spelling, practically all classes who do nature work exhibit great interest in it and display a great fondness for it. Nature lessons, especially at first, should be of a simple character, and of short duration. They may very fittingly be given towards the end of the day, when the pupils have become languid and listless. The children are easily aroused to brightness during a nature lesson; and a judicious use of this fact makes nature study of indirect benefit to the more formal studies. About two to three hours a week should be devoted to the subject, and this time should be so spaced as to allow of three or four lessons each week.

Position in Time Table.

Schools in Large Cities.

Schools in the heart of large cities have special difficulties to contend with, which can only be appreciated fully by those who have actual knowledge of the working of such schools. It will probably be found, in actual practice, that a more extended course of instruction in handicraft and physical measurements, and an elementary course of study in practical mechanics, should be largely substituted for the course in nature study, though it is undesirable that city children should grow up totally ignorant of the beauties of the country side. We are acquainted with slum schools where nature study is taken, though the difficulties are almost insuperable. Shop flowers and smoky parks have to be substituted for the flowers and trees of the hedgerows and woods. There is an excellent scheme in Manchester whereby the children of city schools are taken to a special school in the heart of Cheshire, where such children may continue their regular school instruction, and also, for the short space of two weeks, breathe pure air, pluck beautiful flowers, and observe nature in her true garb.[1] In some cases it is found possible to meet the small expense involved in taking the children occasionally by train or tram to the outskirts of the town where they are within reach of the country side.

Training of Teachers in Nature Study.

4. It is one of the most melancholy things in the teaching profession to find a teacher taking nature study in a school or class when he is hopelessly ignorant of the subject. The case is sometimes made still more pitiable by the teacher's pretence of taking an interest in the work because, as the subject has become somewhat of a fad in certain quarters, he thinks it pays to do so. It can scarcely be expected that, as a rule, teachers will be able

[1] For details of this scheme see *School*, October, 1904.

to conduct a class in nature study successfully unless they have had some training in the work.

Need of Training.

It is true that some educational thinkers have held that training in this work is not essential to a teacher who begins such work with his pupils, provided that he possesses a love of nature, a habit of close observation, and a desire to learn with his pupils. On the other hand, it may be urged that this love of nature, this habit of close observation, and this willingness to learn with pupils are qualities the possession of which is not usual among mankind, and that their possession in any one does imply some previous self-training at the least. Without some special effort to develop these qualities, they are likely to remain dormant in ordinary mortals. If a teacher possess these qualities, together with a knowledge of the facts of the subject, then indeed is he an ideal teacher in nature study.

Training of Pupil Teachers.

As time goes on, nature study will be included in the curriculum of most or all schools. At present, however, it is so rarely taken that it is safest to assume that when young people enter on their pupil-teacher course they know nothing about it. Hence, some instruction in the subject should be included in all schools or colleges which are concerned with the education of pupil teachers. This is the case in many such institutions at the present time, and the subject—under the too ambitious name of biology—may be taken in the examination which concludes the apprenticeship of pupil teachers. As, however, the subject is only an optional branch of an optional subject, there is no certainty that any pupil teacher at the end of his apprenticeship knows anything whatever about the subject. Nature study ought to be taken as one of the subjects in every secondary school,

and especially in those schools and centres which receive pupil teachers.

In Training Colleges.

There is, thus, no certainty that a student entering a training college knows anything whatever about natural history, and, as a matter of fact, the majority of such students never have studied the subject. It is also to be feared that this statement applies to the staff. There is, thus, no guarantee that a trained and certificated teacher knows anything about nature study. This undesirable state of things cannot be remedied until the subject is well taught by competent teachers in all training colleges to those students who wish to become proficient in it. When this is done, there will thus be secured a body of efficient teachers who will be able to take charge of the subject in the schools to which they may be appointed. And as the study is effective only when it is led by one with a real love of nature, it will always be best to place the subject in the hands of teachers specially qualified.

Special Classes for Adult Teachers.

Many local authorities in rural districts have done something to help adult teachers to fit themselves to teach natural history by establishing classes in the subject conducted by well qualified persons; and in large towns and cities it is not difficult for teachers to attend evening classes in natural history, or in botany, zoology, and physiology, in which they may learn the necessary facts. The instruction given to adult teachers should in all cases be of a more advanced character than that given in schools, and should include a course in the elementary principles of biology, in addition to a moderately detailed study of common animals and plants. The work should not be merely observational: it must be largely experimental.

Country Excursions.

Whilst, however, the chief facts and the general principles of nature study may be acquired in the ways above indicated, yet that love of the country side which should be characteristic of all teachers of nature, and which should be implanted in all students of nature, cannot be acquired in the class-room or laboratory. This right relation to the outside world can only come from actual contact with nature herself. Frequent excursions into the country must be taken, and the features and phenomena of nature closely observed. Much may be done in this direction by anyone on his own behalf, though many people require the stimulus of company. If a teacher can accompany a good naturalist on his excursions, he will do well to avail himself of all opportunities of doing so.

Natural History Societies.

Some natural history societies now invite the active co-operation of teachers of natural history, and they would be wise to join such societies. Some societies are perhaps not worth joining; but those whose members make frequent journeys into the country, whose annual fees and excursion expenses are low, and whose active workers include people well versed in important branches of natural history, may render, and in many cases are now rendering, excellent aid to teachers which the latter will seek elsewhere in vain.

The Value of Books.

In most subjects much inspiration may be obtained from books. This is less true of nature study than of other subjects. The teacher of nature must find his subject-matter and his inspiration in nature herself. At the same time, there are a few—a very few—books which have been written about nature which will be of help to the teacher if properly used. The book on nature study or natural history which

is of real service to its readers is one which gives an account of the author's own observations, his own experiments, and his own deductions, and which inspires its readers ultimately to make other observations, experiments, and deductions for themselves.

Many teachers desire a book with ready made lessons written out for them, with the facts of each lesson arranged under suitable headings, and with suggestions as to how these facts may be imparted. There is not, and never can be, any book written on such lines that is worth reading, and no efficient teacher will ever seek or use such a book. There are, it is to be regretted, many such books published, and extensively advertised in school journals. Their great sale is some proof that many teachers have not yet realised the meaning of the term 'nature study,' and a perusal of the books themselves is proof that the authors are in no better plight. In some such books, even the elementary facts are sometimes incorrect. In more than one of them it is still asserted that plants breathe only during the night! One book, issued with the approval of a highly placed official and provided gratis to teachers by many local authorities, asserts that the sap of plants ascends to the leaves through the pith!

It is unfortunately impossible to print a list of books on nature study or object lessons which teachers would do well to avoid; but a list of books which should be of help to teachers of natural history is given at the end of the chapter. The list is not exhaustive, only those being mentioned with which we are personally familiar; but good books on nature study are distinctly uncommon. Some books, excellent in most respects, are partial failures because their authors do not understand the limitations either of the average schoolmaster or of the average school child, and contain instructions which would be excellent if

they were intended for university students, but which are ludicrous if intended even for the oldest pupils of a primary school.

Aids to the Teaching of Natural History—the Nature Excursion.

5. If nature study is to be profitable, out-door work is not merely highly desirable: it is absolutely essential. Class excursions should be undertaken as often as is practicable. There should be at the least four excursions each year—one in spring, one in summer, one in autumn, and one in winter. The same ground should be traversed on each of these four excursions, and the varying aspects of nature noted. If more than four excursions are undertaken, other routes may be chosen. The ground to be traversed should be carefully chosen. It should not be of great extent, but it should, if possible, be of varied character. Too many children should not be present on an excursion. If only one teacher is present, about twenty children may accompany him. If two teachers are present, the number may be increased to about thirty. It is doubtful if the nature excursion can be rendered profitable if more than thirty-five children form the party. Each pupil should take with him on the excursion a pocket book, a pencil, a penknife, and, if possible, a pocket lens. At certain places the teacher should gather his pupils around him, and ascertain that the right things are being studied. At such times entries and sketches may conveniently be made in the note-book. A few boxes, tins, and bottles, for the proper carrying of specimens, should also be taken.

Each excursion should have some definite object, which should, in a general way, be made clear to the class before the commencement, otherwise, so much is there to see out of doors, attention will be too diffused and distracted to be useful. It rests with the teacher to make quite

certain that each member of the class is fully occupied during the excursion, or valuable time will be wasted in profitless chatter. The teacher should go over the ground beforehand, and have his mind made up as to the particular thing to which attention is chiefly to be drawn.

But the excursion must not become too stereotyped, and actual and original observations by the children must receive recognition. The pupils must be taught to see things for themselves and by themselves, and this power is one that is of rare occurrence in both children and adults, and one most difficult to develop. Any average individual can see what he is told to see, or easily persuade himself that he sees it; but the nature excursion to a great extent fails of its purpose if it does not develop in the pupils the power of making original observations. A too rigid adherence to an excursion programme tends to check these original observations; whilst, on the other hand, an excursion without a definite object in view tends to become discursive and unprofitable. It is equally a mistake to set out on an excursion with no definite aim in mind, and to give to each pupil written or printed instructions telling him what objects to look for and where they may be found. Between these two extremes it is the duty of the teacher of nature study to find some happy mean.

A Model Excursion.

The determination of common trees by their buds and bark furnishes an excellent object for a nature excursion in winter or early spring for pupils of about ten years of age. The pupils should be asked to find some trees with rough bark, and some trees with smooth bark. This done, they should be sent to re-visit the same trees, and to notice the kinds of buds found on the trees with smooth bark and on those with rough bark respectively. Of the smooth-barked trees

some will be found to have long and pointed buds, brown in colour, and others to have stout buds, green in colour. The buds on the former are arranged alternately one on each side of the young twigs, whilst on the latter the buds are arranged in opposite pairs, each pair at right angles to the pair above and below it. The former tree the pupils should be told is the beech, the latter the sycamore.

Of the rough-barked trees some have black buds arranged like those of the sycamore: these are ash trees. Others have brown buds, and these need discriminating. The pupils should be asked to try to place them in two groups, classifying them by the arrangement of the buds on the young twigs. They may need some guidance at this stage. This done, the arrangement of the buds of the two kinds should be described by the children. Those twigs with brown buds, from the rough-barked trees, whose buds are arranged spirally all round are specimens of oak, and those whose buds are arranged alternately on two sides (like the buds of the beech) are specimens of elm. Finally, the trees from which the specimens have been taken should be observed as wholes, and their general size and form noted.

The District to be Utilised Fully.

Other trees will probably be met with on the excursion, and perhaps some of those mentioned above will not be seen. It depends on the teacher to make the most of the possibilities of the ground traversed. If lime trees are met with, they may be identified by the smooth bark and brown buds arranged alternately. If birches occur, they will be easily noted by their characteristic bark—brown and white, flakey and polished—and by the delicate tracery their buds make against the sky. Questions will probably be asked about the unopened catkins of the birch. If ripe catkins of the hazel are found near at hand, there will be little

difficulty in answering the questions at once; but if not, the answer had better be postponed until the birch catkins are ripe, and the pupil who has asked the question should be deputed to bring some such specimen to the class in April or May.

In many districts firs, pines, and larches are abundant, and will demand attention on the excursion. The leaves of the pine and the fir are evergreen, while the larch is deciduous. Those of the pine are needle-shaped, and arranged in groups of two, three, or five. The leaves of the fir are single. Those of the larch, when they do appear in April or May, are found to be arranged in clusters of about a dozen. In some districts oaks are absent, birches absent or rare, hornbeams fairly abundant. The particular trees which must be studied are those which are abundant near the school. It will be seen, then, that the teacher, to conduct a nature excursion successfully, must possess a deep and varied knowledge of outdoor life, and he must be acquainted with the intricacies and peculiarities of his own school district.

Interesting Phenomena.

Whilst studying the trees on this excursion interesting things may be noted which have little or nothing to do with the particular object of the excursion. Perhaps a hare or a fox may be seen crossing the fields. Perhaps squirrels may be observed among the branches of the trees. Perhaps a hibernating dormouse may be found in its spherical nest of hay. Perhaps some winter migrants—field-fares or redwings—may be seen in the gardens or fields. The teacher must decide how far such unrehearsed items shall be discussed. Anything which furnishes a rare opportunity for observation should be turned to good account by the teacher and his class; and this need not interfere with the particular study for which the excursion is being

undertaken. After all, it is of greater importance that a unique sight should be carefully observed than that a particular scheme of carrying out a lesson or excursion should not be interrupted.

The Excursion and Class Work.

The excursion must be correlated with class work. An account of the excursion should be written by each pupil. This exercise should be set in class at the earliest opportunity. The object is not to train the memory, but to ensure that the most is being made by the pupils of their opportunities. Consequently, the pocket note-books which the pupils used on the excursion may be consulted by them when writing out this account. The written account should be put in the class note-book which is used for nature study, and should be illustrated by sketches elaborated from the pocket note-books. Specimens brought back from the excursion may also be again observed by the pupils when writing out this essay. The older pupils should be able to write quite good essays, but the accounts of the younger pupils will be bald and crude at first. Spelling and syntax need not, at first, be regarded as matters of primary importance. What is of importance is that the pupil should cultivate the power of expressing in his own words what he has seen and learnt.

Specimens Gathered.

Many of the specimens brought back from excursions are such that they admit of preservation without difficulty. Twigs of trees are such objects. These should be utilised as specimens for the school museum, that is, they should be so placed that they may be seen and observed by the pupils at any time whilst lessons on nature are in progress.

It is, we hope, unnecessary to say that the school excursion need not be the occasion of any acts of vandalism. Twigs must not be ruthlessly torn from trees. If they are

cut carefully with a penknife, the tree will not suffer; and the same remark applies to flowers. "Orchis pluck, orchis kill: Orchis cut, orchis still," is an old country rhyme which should be constantly in the teacher's mind when he is leading an excursion. If animals are examined, all semblance of cruelty should be avoided, and they should be set free without their having suffered injury. If they are carried back to school, it must be in such a way as not to injure them, and at the earliest possible moment they must be put in a suitable place. Pond animals are easily carried in water in bottles. Aquatic animals from streams will not as a rule live in the stagnant water of an aquarium, and they should not be experimented with in this direction. In the aquarium they will only die and foul the water. Not more than one animal should, as a rule, be carried in one receptacle, as most animals are to some extent carnivorous.

Subsequent Lessons and Excursions.

An excursion with the above object should be followed by lessons on the flowers, leaves, fruits, seeds, and seedlings of the trees examined on the excursion. The leaves of the trees furnish a suitable object for a summer excursion. The flowers of the trees could not all be met with on a single excursion, as they appear at different times of the year. The flowers, then, should be studied in class as they appear on the trees. The flowers of the elm appear in March and those of the ash during April, in both cases when the trees are bare of leaves. The sycamore and birch flower during late April or early May, whilst the leaves are unfolding and enlarging. The oak and beech flower in May, and the flowers appear with the young leaves. A few trees such as the horse-chestnut and the lime produce their flowers during summer, when the leaves are full grown. The relation between the appearance of the flowers and leaves

of particular trees furnishes a little problem which a class may very profitably be set to solve.

Maps.

Each school should be provided with copies of large scale maps of the district immediately surrounding the school. On one of these maps should be marked the usual routes of the school excursions, and the chief features, such as streams, ponds, hills, banks, commons, and woods, which are encountered on the excursions. The ordnance maps on the scale of six inches to the mile, issued by the Ordnance Survey Office, Southampton, are very suitable for this purpose; and the very cheap rate at which schools may now be supplied with these maps removes any objection which might be urged on financial grounds against the supply of at least one or two copies of these maps to each pupil in the upper years.

List of Excursions.

A list of suitable objects to be studied in nature excursions is here appended. The list is intended to be suggestive and not exhaustive. Any good teacher of nature study could easily add more.

In winter:—

- Winter buds—on trees and in the soil.
- Prickly plants—hawthorn, gorse, briar, bramble, holly, thistle.
- Hibernation of common insects.
- Bird life in winter.

In spring:—

- Leaves and flowers of woodland plants.
- Seedlings.
- Songs and habits of birds.
- Insects of streams and ponds.

In summer:—

- A hayfield. Grasses in flower.
- Ferns and horsetails.

Pollination of flowers. Bees at work.
Caterpillars and butterflies.

In autumn:—

A cornfield. A study of weeds.
Fruits and their methods of dispersal.
Resident and migratory birds.
Kinds of insects.

School Gardens.

Many schools, now-a-days, have gardens attached, and lessons in gardening often form a definite portion of the curriculum. School gardens ought to be of great assistance to the pupils in nature study as well as in gardening. The mature stages of peas, beans, and other annuals should be studied from the specimens raised in the gardens, though the earlier stages of these plants are best studied from specimens which have been raised in the class-room in boxes of damp sawdust or cocoanut fibre. Certain organs, such as root hairs, are only seen to advantage in specimens raised in this latter way. Bulbs, tubers, tap-roots, and other underground organs of perennial and biennial plants may also be studied similarly, the adult stages being studied in the garden and the earlier stages from specimens which have been sprouted indoors in boxes of sawdust and jars of water.

Aquaria.

Every school should have a properly equipped aquarium stocked with water plants, snails, and a few small fishes. Aquaria with flat bottoms will be found much more manageable than those with round bottoms. Each year the stages of development of the frog should be watched, and the emergence of some perfect fly from its aquatic pupa. In addition to the aquarium, bottles containing one aquatic plant and one or two small aquatic animals are also desirable. It will be found that the development of young snails from snails,

eggs, and of perfect insects from pupae and larvae, will afford never-failing interest to the pupils. The aquatic plants should be fixed to the bottom of the aquarium by means of stones and sand, and if suitable plants and animals are chosen the water need seldom be changed. The animals and plants which are utilised should, as far as possible, be chosen from the ponds near the school. The animals and plants which are found in streams are, as a rule, totally unsuited for life in the stagnant water of aquaria.

Terraria.

A terrarium is also a most desirable adjunct for nature study work. Just as an aquarium is a piece of apparatus for studying aquatic life, so a terrarium is a device for studying terrestrial life. The terrarium need not be an expensive affair. We have seen an excellent terrarium made from an old soap box with the sides removed, the long sides being then fitted with glass, and the short sides and top with a sheet of perforated zinc. The top was removable. The bottom was covered with three or four inches of soil in which grass and clover seeds were sprouting. A few young cabbage plants were planted at one end. Leaves of the nettle and other plants were added as required. In this terrarium, the life histories of common butterflies and moths, such as the cabbage white and the tortoiseshell butterflies, and the tiger and the vapourer moths, were enacted. Caterpillars were devouring the leaves, chrysalids were hanging in odd corners, and, after emergence, one or two perfect insects were retained, whilst the rest were set at liberty. The insects sipped a syrupy liquid of sugar and water, and sucked honey from flowers which were added from time to time.

We have seen other terraria inhabited by frogs, toads, lizards, and young grass snakes. Occasionally, in schools. we have seen pet rabbits, dormice, and squirrels, and even

a hedgehog and a mole. All this involves trouble for somebody, as the individual needs of each animal must be attended to, not only during the school days, but also during week-ends and vacations. Many boys, however, keep pets at home, and the teacher may lighten his labours by deputing trustworthy pupils to tend the school pets. The work which the keeping of pets entails is well remunerated by the unfailing interest which is aroused, and by the never ending source of gratification and profit which follows.

Nature Diaries. The pupils should be encouraged to keep diaries in which to enter interesting natural phenomena as they occur. A class diary should also be kept in which a summary of the events observed by the various pupils should be entered. The class diary may be placed in charge of one of the pupils, who, after a little help from the teacher, will be able to do the work quite well, and will take a great pride in doing it. The diaries of one year should be compared with those of previous years. It is only by this kind of work that the pupils will be enabled properly to study the seasonal succession of natural phenomena, and to say, with any degree of certainty, whether or not a given season is early or late. A few entries, such as should be placed in the diaries, are given below:—

Feb. 3.—Hazel in flower, Jackson's Copse.
" 7.—Willow catkins showing white, Jackson's Copse.
" 18.—Sycamore seedlings emerging from their cases, Hartley Farm.
" 22.—Rooks at Harold Hall begin to be noisy.
" 26.—Coltsfoot in flower on the railway bank.
" 28.—Last few days very mild.
Mar. 1.—Rooks commence building new nests and

repairing old ones, Harold Hall. Celandine, dandelion, dog's mercury in flower.

Mar. 13.—Five wild geese seen at Sewage Works, Beckford.

„ 18.—Alder in flower, Lady Brook. Frog spawn and young tadpoles in Stroud's pond.

„ 24.—Elm, lilac, and sycamore showing leaves.

„ 25.—About forty rooks' nests at Harold Hall, or ten less than last year.

„ 28.—Wagtails at Lady Brook. Thrush sitting at Jackson's Copse. Anemone in flower, Jackson's Copse.

„ 29.—Heavy fall of snow, followed by rapid thaw.

Models and Diagrams.—Should be made by the Pupils themselves.

It appears to be a prevalent view amongst teachers that models and diagrams are great desiderata in the equipment of a school which does nature work; but what, after all, is the end aimed at by the use of models and diagrams? Is it not to make clear the form, structure, and functions of the objects studied? If so, it follows that models and diagrams are useless unless the objects, in addition to models and diagrams of them, are also examined, and that bought models and diagrams of objects actually studied are superfluous. It also follows that if models and diagrams are made by the pupils themselves from the natural objects, the value of these models and diagrams is considerably enhanced, for such work necessarily entails a more careful examination of the actual objects, and a fuller understanding of them.

Further, bought models and diagrams are expensive, and the money at the teacher's disposal for nature study may be more usefully expended in other ways. It is very discouraging on visiting a school where nature study

is taken to be shown costly diagrams and models, expensive cases of dried tree-specimens, stuffed animals, and the like. Local authorities would perform an excellent service to the cause of true nature teaching by refusing to buy such articles. Models, diagrams, and cases of specimens have little educational value unless they are made and fitted up by the children themselves from actual objects. Such school-made or home-made specimens may not possess the same mechanical elaborateness or perfection as the bought article, but the former have served a higher educational purpose than the latter can ever hope to serve.

Model Models.

We have seen excellent models of fruits, such as apples, plums, and oranges, produced by children. In one case the models were made from fuller's-earth which was found near the school; but clay, plasticene, and other materials may at any time be purchased for the purpose. The models should be made and coloured from nature, not from other models or from pictures. Some should illustrate the external form and colour, and others the form and structure of sections. With a little ingenuity, hinges may be attached, so that the models may open and shut. Such models, we repeat, are actually made in some schools. Another set of models which we have seen illustrated explosive fruits, and, by the judicious use of whalebone and elastic, afforded a very plausible imitation of the explosive fruits of the hairy bitter cress, a common weed in lowland gardens. Even when the models made in this way are not very lifelike, the attempts to make them so have resulted in a sounder knowledge of the things modelled, and thus the educational result is greater than is possible from the examination of costly models without reference to the actual object.

Drawings and Diagrams.

As a rule, bought diagrams are superfluous, and their place should be taken by large drawings made by the children from the object. Fortunately, this aspect of nature study is now being much emphasised in certain quarters. It must be borne in mind that it is no more one of the ends of nature study to train artists than it is to train scientists. It is, however, an important aim of the subject to cultivate the powers of observation and expression, and drawings and models must be judged in this light. The drawing and colouring of plants and animals from printed copies is no part of nature study. We have seen such work on view in nature study exhibitions, but surely it was out of place. One exhibit consisted of a number of colour washings of the snowdrops. The work was excellent from many points of view, but each painting was like its fellows, and all were like the printed copy and singularly unlike the snowdrops of the gardens. The work was excellent in its way, but it was not nature study.

Drawing Books and Note-Books.

The drawing of natural objects should begin in the class where nature study itself begins, and should be continued in every higher class. Every object examined should be drawn. The drawings need not be criticised from the artistic standpoint: the teacher should be content if the child's powers of observation and expression are being fully developed. The drawings should be made in a note-book, and each drawing explained by notes. There should not be one book for drawings alone, and another for notes. The drawings may be in pencil during the earlier stages, but the power of drawing in ink should be cultivated later, especially in the case of specimens with simple form and outlines, such as leaves, fruits, and butterflies.

Oral and Written Descriptions.

The children should give an account in their own words of the things they see and examine. Some difficulty in this matter will be encountered at first, as it is not easy, even for adults, when dealing with strange matters to distinguish the essential from the inessential. It is desirable, therefore, for the teacher at first to have some definite plan in his mind as regards the description to be given, and the points should be taken one by one. Important points in the description of almost any object taken in nature study are:—Kind of thing, where usually found, its general shape, its general colour, its size, the separate parts, the use of the separate parts, the use of the whole object, the relation of the separate parts to the whole object and of the object to its natural surroundings. Questions should be asked by the teacher about each of these matters, and the questions, as a rule, should be such that they can only be answered by a reference to the actual object. When a good answer has been obtained the pupils should write down in their note-books what has just been found out. Neither notes nor drawings should ever be copied from the blackboard, and notes should never be written down at the teacher's dictation.

Museums and Collections—Public Museums.

The school museum is an adjunct in many schools where nature study is included in the curriculum. Other schools, which possess no museum of their own, occasionally pay visits to public museums. The average public museum is one of the worst places possible in which children can attempt to do serious work in nature study. The exhibits are arranged according to a system of classification, which, though it is a boon to mature scientists, is foreign to the mind of the child and to the minds of adults unversed in the advanced natural sciences. The specimens, being more

or less valuable, are kept out of the reach of the inquisitive and the destructive in dust-proof eases with glass fronts. They may be seen, but not handled.

Such institutions serve many useful purposes, but their value as instruments in the education of children has been greatly exaggerated. Here and there a museum curator is fired with the laudable ambition of rendering signal service to school children in their study of nature. Then the systematically arranged specimens of fossils, shells, insects, and birds are supplemented by cases exhibiting the life-histories of common animals and plants, of trees in their various stages of seasonal development, and of plants which grow together in woods, or moors, or marshes. All this is an advance on the more stereotyped mode of exhibiting specimens, but as a method of nature teaching it is wanting in several particulars.

School Museums.

The essence of nature study is that it is work done by the pupils, and not work done for them by other people, however well intentioned the efforts of these people may be; and any exhibit in a public museum which may be of service in nature teaching is also such that it may be made in the school and by the school children. In the latter event it need not be enclosed in a glass case. The school museum is an institution which may be of great service if it is founded and worked on the right lines. It must not, however, be regarded as a repository of curious or even interesting objects.

Character of Good School Museums.

Most school museums are started by getting together a number of fossils and shells, butterflies, birds' eggs, and stuffed animals. Many boys, and some girls, have the nucleus of some such collection, and may often be persuaded to place it in the school museum. Elder

brothers and sisters, parents and friends, may possess similar collections which have ceased to arouse interest, and these, with little difficulty, may also often be obtained for display in the school museum. After the lapse of some little time, however, it is invariably found that such a museum has not answered the expectations of its founders: it soon ceases to interest either teachers or pupils; the specimens get dirty and broken; and the whole thing is admitted to be a failure. The mistake has been made that the wrong things have been put in the museum, and that they have been obtained by the wrong methods.

The right method is to exercise the pupils' love of doing, and to be concerned only with those objects which have some relation to the pupils' lives—their lives in home and school and their lives out of doors. When the pupils are studying trees let them retain some of the specimens. Let different pupils confine their attentions in this department to one particular tree. Let one retain specimens of oak, another of ash, another of beech, and so on for the common and accessible trees near the school. Let the specimens illustrate particular points, such as twigs in winter, twigs in late spring, unfolding buds, flowers, leaves, fruits, seeds, and seedlings. Let simple dissections be made of certain specimens, for example, of unfolding buds, and let the various parts be gummed on cardboard in proper order. Let some complete sets be mounted on large sheets of cardboard, and let these be hung on the school walls. Let other complete sets remain unmounted and, put in boxes without lock and key, be accessible at all times. Then will the school museum be started, and be in a fair way for success. Other objects may be treated in a similar way. It will, however, probably be found that it is impracticable for one class to treat more than two or three sets of objects in this manner in a single year's time.

These mounted sheets and loose specimens are at any time available for class instruction, and are thus of greater value than specimens in public museums, which at best are only available for this purpose on rare occasions. Further, the objects, having been made by the pupils, will be a constant source of pride to themselves and of emulation to their comrades. Of course the specimens will get dusty and untidy in time; but also, by that time, those particular specimens will have ceased to interest. They must be replaced by similar specimens made in a similar way. The school museum then is in one sense a temporary affair. The individual specimens do not remain long in existence: they do not require expensive cases; and they need replacing from time to time. In another sense it is a permanent affair; for it is a constant source of employment, interest, and instruction to those whom it is intended to benefit.

Living Objects of First Importance.

Above all, it must be remembered that nature study is, in so far as it deals with animals and plants, a study of living things; and that, therefore, living objects are of much greater importance than museum specimens. The latter must never be substituted for the former. The school museum is not an end in itself: it is merely an adjunct in nature teaching. Of far higher value than the school museum are the school aquarium, the school terrarium, the Wardian case, the plants in pots, and the germinating seeds in sawdust.

Collections.

A great deal of nonsense has been spoken and written about collections of natural history objects—none the less nonsense because it has been spoken and written by excellent naturalists. In fact, many collections are unjustifiable. Such collections are those which merely feed the desire of possession, and which involve wanton destruction. These are nothing but

collections, and should be discouraged. Collections of birds' eggs, of dead insects, and of dried plants are not inspiring. Neither have they any educational value in a school. But the collecting spirit is strong in boys; and in any given school it is almost a certainty that some boys are, of their own accord, getting together a collection of some sort. It is the duty of teachers of natural history to see that these collections are of the right sort, that they are made in the right way, and that they are utilised for the right purpose. The fundamental traits of the boy's character that impel him to make a collection of some sort are his innate love of activity, and his excusable desire to see the product of his activity. Is it not more reasonable to utilise these qualities, than simply to concern oneself in emphasising the futility of mere collections?

We have already advocated the collecting of specimens of trees illustrating seasonal development, and this is by no means the only collection of educational value in nature study which pupils may be encouraged to make. Other examples of collections are: specimens illustrating the dispersal of fruits and seeds by the wind; twigs of plants with thorns and prickles; kinds of leaves; cornfield weeds in various stages of growth; injurious insects in various stages of their life-history, with specimens of the crops on which they feed. All collections should be accompanied by written verbal explanations, and by illustrative sketches. The aim should be to have not a large collection but one which the collector understands. Such collections not merely do no harm, but they possess an educational value in themselves. They also turn to good account certain inherent traits in the characters of children which no amount of either teaching or preaching will ever eradicate.

The specimens collected, in many cases, should go towards stocking the school museum. Children like this kind of work, and it is eminently suitable to be undertaken out of school hours, and especially during vacations. It will be seen that any objects which are suitable for the school museum are also suitable for collections, and that the right form of collecting furnishes an excellent method, not only of stocking the school museum, but also of properly directing the energies of pupils with collecting instincts and of providing useful vacation work. It is scarcely necessary to say that collecting must not in any way take the place of a study of live objects in their natural surroundings, but must be so used that it is a help to such study.

Correlation with other Subjects.

6. It will be seen from the foregoing that nature study is naturally related to several subjects which are taught in primary schools. Many aspects of geography are, in fact, integral portions of the subject. In this chapter the term has been limited to the study of living things; but nature is not all living, and the study of natural phenomena

Geography.

—of rain, snow, ice, clouds, etc., of rivers and their work, of the sea, of hills and mountains, and of valleys and plains—is nature study equally with the study of plants and animals.

Many natural regions in foreign lands have strong resemblances to certain limited areas in this country. Any natural British wood, for example, typifies the temperate forests of the northern hemisphere. A tract of sandhills on the British coast has many points in common, with regard to climate, soil, and vegetation, with the great sandy deserts found in many continental areas. A British estuarine mud flat has marked resemblances in physical and soil conditions with the mangrove swamps of tropical

shores, though the vegetation of the two areas is in sharp contrast owing to climatic differences. A Pennine moor has many points of agreement with the enormous stretches of Arctic tundra. A teacher of natural history should be also a student of geography in its widest sense, and should be prepared to teach both subjects.

Handicraft, Drawing, and Modelling.

Every lesson in nature study should also be, to some extent, a training in the correlated work of hand and eye. Many of the models of natural objects may be, and should be, made during the time allotted in the time-table to manual instruction. This applies especially to cardboard work, clay modelling, and woodwork. Every scheme of work in drawing and modelling should include examples from natural objects; and, of course, every lesson in nature study should include some work in drawing and at times modelling the object studied. There should be a common understanding between the teacher of natural history on the one hand and the teachers of manual work and of drawing and modelling on the other; and thus much time may be economised in the working of the school.

English.

The cultivation of verbal expression, both written and oral, is one of the chief ends of nature study. The powers of verbal description and comparison are very deficient not only in most school children, but in many adults, and the training of these powers receives far too little attention in most schools and colleges. It cannot be expected that young children will be able to write good essays on abstract subjects; but every nature lesson should exercise the pupils' power of verbal description: the majority should give practice to their power of comparison: most, if not all, should train their power of writing down in words what they have discovered by observation. Even quite young children should do something

in these respects. The teacher must not expect rounded sentences and precise phraseology, but simple ideas may be simply expressed by the children even in the lower years.

The connection between the study of nature and literature is very direct, for the best literature is full of the poetry of nature. Great writers interpret nature to us, so that we find in it depths which, without their aid, we should never have suspected. Just as a picture of Turner has manifested to thousands beauties and meanings in familiar scenes to which they had hitherto been oblivious, so it is with a sonnet of Wordsworth or an ode of Shelley. The eye of the poet sees more than does the common eye, and his dulcet tones bring home to the prosaic common mind that every piece and aspect of nature has its own beauty. Most men need such an interpreter before they can gain from nature all they are capable of receiving.

These thoughts suggest to us the kind of reading book that should be used in connection with nature study. The too common form of 'nature reader' which attempts to teach at second hand facts which are only fruitful when gathered at first hand should be rigidly excluded from the school. Just as the function of the history or the geography reader is not to teach facts, but to bring the pupils' minds into sympathetic relations with peoples of other times and other lands, so the function of a nature reader is to bring them into living relations with nature. It does not aim at imparting facts about nature, but at awakening a love for nature, and in cultivating an attitude of mind responsive to nature's voice. And the best and most effective way of doing this is to let the pupils read some of the finest pieces of literature which have nature and the beauties of nature for their theme. A nature reader may, then, consist of a selection of passages of real literature

both in prose and verse which breathe throughout the true spirit of the lover of nature.[1]

Another kind of reader which deals with natural history may be found interesting and of some value—that which aims at extending the pupils' knowledge by describing things which fall outside the range of observation of the average school child. Such a book makes no attempt to supplant observational work or to describe experiments which may be performed by the pupils. But it utilises their direct experiences by calling on them to picture remote scenes. And as the pupils' knowledge and love of nature increase they will desire to hear of the forms nature takes in places beyond the range of their own observations, and will welcome a book which helps them so to widen their knowledge. Such a reader may compare and contrast the products of distant lands with those of our own country, and enter into some detail with regard to the aspects of distant lands which send to our shores various exotic products. It may compare a rice plantation with a British wheatfield, and the African veldt with the Yorkshire fells. The reading of such a work is not directly nature study, but it is a logical outcome of it.

Mathematics.

The connection of nature study with mathematics is not obvious at first sight; and herein lies a weakness of nature study. The latter subject is apt, in practice, to become loose in its observations and vague in its conclusions. This, indeed, is not altogether an inherent weakness, but it is one which every nature teacher needs guard against. To some extent this defect in the subject may be remedied by measurements, taken at

[1] An admirable book of this kind is *A Nature Reader*, edited by Sir J. A. Cockburn and Mr. E. Speight, and published by Hodder and Stoughton.

regular periods, of growing organs by accurately counting certain detailed structures of organs, such as the serrations of leaves, and calculating averages, and by many similar observations. Such work is, indeed, becoming an important part of advanced biological work, and has already led to several useful generalisations; and there is every reason why such work should be included in elementary courses of nature study. In any event, however, this weakness of nature study ought to be frankly admitted even by its most devoted adherents; and we are strongly of opinion that every course of nature study should be supplemented by a course of work in careful physical and mathematical measurements.

Course of Study.

7. In choosing lessons in nature study, preference should be given to those subjects which lend themselves to the solving of easy problems by careful observations and simple experiments. The apparatus used in the experiments may usually be home-made or school-made. Expensive apparatus for nature lessons in schools is hardly ever desirable. The lessons should be vitally and intimately connected with each other, and the teacher should not attempt, at the beginning of a course of instruction, to give separate titles to each lesson.

i. For the Earlier Years.

A highly suitable series of lessons for the earlier years may be found in seeds and the conditions necessary to their germination and their growth to mature plants.

The First Lesson on Seeds.

The first lesson on the broad bean to pupils of the lower years requires the following specimens:—Bean pods, some fresh (if obtainable at the time the lesson is given) and some dry, with attached seeds inside; and some dry beans. Each pupil should have at least one specimen of each.

The nature, colour, size, general shape, and markings of the dry bean should first be orally described by the pupils, and then the specimen should be drawn. The significance of the black scar may be understood by a reference to the beans attached to seedstalks in the pods. Then an account of the things seen and learnt should be written by the pupils. This is as much as should be attempted in one lesson.

The Second Lesson.

The second lesson requires dry beans and also beans which have been allowed to soak in water overnight. It should begin with a brief re-statement by the pupils of the things seen and learnt in the first lesson. This should be followed by a description of the soaked bean. Then the dry beans should be compared with the soaked beans, and the differences described by the pupils. At once problems are suggested which only future work can solve. Why is not the soaked bean wrinkled? Why is it not hard and brittle? Is the soaked bean heavier than the dry bean? Is there an opening in the seed, and how may such opening be demonstrated? Would water enter the bean if the opening were stopped by sealing wax or by rubber solution? Does water enter the seed through the scar? Would water enter the seed if the scar were covered with rubber solution? Does water enter the bean through the seed-skin?

Such questions should suggest experiments for future lessons. They cannot be answered at the time they are raised, but all may and should be answered by work actually done in class. The answers should not be supplied by the teacher. Continuing the lesson, the skin of the dry bean should be removed by means of a pen-knife, and the germ or young plant inside should be examined. Then the skin or coat of the soaked bean

should be removed. This is a much easier matter than the removal of the skin of the dry bean. The two large lobes, the young root which pokes outwards and downwards, and which fits into a pocket of the seed-coat, and the young shoot which is carefully packed away between the two lobes should be noted. The full significance of these parts will not be understood by the pupils until they have watched the growth of the leaves for some weeks. The germ inside the seed-coat should be drawn in such a position that the different parts and their relation to each other may be seen. Then a written account of the parts should be given by the pupils.

The Third Lesson.

In the third lesson the seed of the bean should be compared with other carefully chosen seeds, such as those of the pea, the sycamore, and the mustard. These should be drawn to show the parts which correspond to the parts of the bean. The generalisation should eventually be made that a seed consists of a seed-coat enclosing a germ or young plant with lobes ('seed-leaves'), young root, and young shoot. In all cases it will be found that soaked seeds are more easily examined than dry ones.

The various seeds examined should have been planted, some in damp sawdust for the examination of the early growing stages, and some in soil in pots and in the beds of the school garden for the examination of the maturer plants later in the season. The teacher should calculate at the commencement the approximate number of seeds his class will require. The seeds should be planted by the pupils at the beginning of the series of lessons, and the teacher will be well advised in taking the precaution to plant some a week or a fortnight earlier, as a spell of cold weather may delay the germination of the specimens planted by the pupils.

The Fourth Lesson.

The fourth lesson requires beans which have so far germinated that they show an elongated young root, and the young shoot forcing its way out from between the seed leaves or lobes. The parts in their present condition should be observed, described and drawn, and compared with the same parts as they existed in the seeds before germination. Further problems will here arise for solution. What things are needed to make the seed sprout? Is soil necessary? Is light? Is water? Is warmth? Is air?

Succeeding Lessons.

The fifth and two or three succeeding lessons should consist of simple experiments designed to answer some of the questions raised. It will doubtless have been suggested that soil is necessary for the germination of seeds. The pupils should fix a soaked bean by a needle to the cork of a large bottle about a third full of water. It will be found that the bean will germinate in the damp atmosphere of the bottle. It should also be shown that a bean will germinate in darkness. The necessity of warmth may be shown by futile attempts to grow beans in soil or damp sawdust in which ice is kept and replaced as it melts.

Moisture may be shown to be essential by the pupils observing that seeds never germinate if kept in dry places. It is more difficult to prove that air is necessary for germination, but seeds may be shown not to germinate if kept in bottles quite full of water or of coal gas, even if moisture and soil are also supplied. Practical direction for these experiments may be found in text-books, especially in Osterhaut's *Experiments with Plants*. The seeds, which all the while are germinating, should be examined in their various stages until the mature plants have grown in the pots and in the gardens. Then the mature organs, the root, the stem, the leaves, the flowers,

and finally the pods and seeds, should be examined in turn. All through, observational work should be correlated with experimental work; and the experimental work should be such that it answers the questions put by the pupils or suggested by the teacher. Such a course of lessons as is here outlined should furnish work which may begin about Easter, and which may terminate about the commencement of the midsummer holidays.

Lessons on Other Subjects.

It is not desirable that, during the time that seeds and their germination are being studied, no other subjects shall be taken up by the class. The important point to notice is that such a course of lessons must of necessity occupy a few months; and, whilst the plants are growing and the experiments proceeding, many opportunities are sure to arise for dealing with other seasonable subjects in a rather less detailed manner.

Other Courses.

Besides detailed work on seeds, the pupils in the earlier years may also examine a few simple flowers, and study the methods of dispersal of fruits and seeds, the development of the frog and of a common butterfly, and the simple facts of the respiration of animals. The particular order of the various courses is not so important as it is that the individual lessons in each course should grow out of each other, and thus be vitally and organically connected. In every year some out-door work is necessary, and the excursions taken should be in connection with the lessons.

ii. For the Intermediate Years.

For pupils of the intermediate years some lessons on the subjects studied in the earlier years should be taken, other specimens being used. Instead of beans, peas, sycamore, and mustard, other seeds, such as laburnum, gorse, wheat, and onion, should be studied. The treatment should also be

of a rather more advanced nature. The reserve food in seeds should be noted, and a few simple tests, such as the iodine test for starch and the lime-water test for carbon dioxide, should be explained and applied.

Observations on the Potato.

Some underground organ of a biennial or of a perennial plant should be studied on the same lines as seeds. The tuber of the potato will answer admirably. The potato in its resting state should first be examined. The eyes containing the buds of the tuber should be observed, and it should be noted that the eyes are aggregated at one end. At the other end the remains or scar of the stalk which attached the tuber to the parent plant may be seen; but it is probable that this cannot be well demonstrated until a growing plant with young tubers attached to it is observed. The two ends may, however, always be distinguished by the number of eyes being greater at one end than the other. The two ends should, for the sake of convenience of reference, and in order to emphasise their different natures, be named—the one the 'eye end,' or 'bud end,' or 'growing end'; and the other the 'stalk end' or 'barren end.'

These names should not be given until the children have grasped the fact that the two ends are really different, and this fact will not be fully realised until the specimens have been allowed to sprout for a few weeks. The position of the eyes should be carefully noted. This can only be done satisfactorily by fixing a pin in each eye and joining the pins by a piece of thread. If the thread is first fixed on the pin nearest the stalk end, and then fixed in order on each pin next in distance above, it will be found that the eyes are arranged in a spiral, that the sixth eye is exactly over the first, and that the thread in going from the first to the sixth eye goes round the tuber twice. This arrangement should be compared with the arrangement

of buds on twigs of the oak and of leaves on stems of the wall-flower.

Experiments with the Potato.

Potatoes should be planted, as were the seeds, some in the school garden or in soil in pots, some in sawdust or cocoa-nut fibre kept permanently damp, some in damp air, some in water, and some in soil. Some should be planted with the bud end upwards and some with the bud end downwards. Some should be cut in two, thus separating the bud end from the stalk end, and each half should be planted. Some should be cut up into a number of pieces, some pieces with an eye, and some pieces without.

The condition of the planted specimens should be observed from time to time. After a week or two, when the buds have begun to sprout, there will be no difficulty whatever in distinguishing the bud end or growing end from the stalk end or barren end. Problems will arise as in the case of the growing bean. Will the buds of the potato sprout if kept in the dark? Do all the growing specimens gain in weight? Which do not? Why do the tubers with growing buds turn soft? In the case of the specimens which gain in weight, where does the extra material come from? In the case of the specimens grown in the dark, at what stage do they die? Do the growing shoots of the latter specimens turn green? The lessons on the potato may be begun in May, but they cannot be concluded until the specimens planted in the garden and flower-pots have fully matured in the following autumn.

Other Work.

The roots, leaves, stems, flowers, and seeds of the potato will, of course, be studied as well as the tubers. Other courses may be taken by pupils of the intermediate years on bulbs, on the identification of common trees and shrubs, on the work of flowers, on the dispersal of fruits and seeds in greater detail than

was taken in the lower years, on the development of three or four common insects, on birds, and on the blood circulation of the higher animals. The work of the pupils of the intermediate years should show a distinct advance on that of the pupils of the lower years. This advance must be seen in the nature of the observations, in the pupils' power of expression by oral and written descriptions and by drawing and modelling, and in the ability to draw general conclusions and inferences.

iii. For the Later Years.

In the later years lessons should be given on the constituent gases of the air, on water, and on the different kinds of soil. Then the pupils will be able to understand such subjects as the importance of oxygen and of carbon dioxide to plants and animals. Simple lessons on sound, heat, light, magnetism and electricity, and on force and mechanical devices are also desirable. Other courses should include further observations and experiments on seeds, bulbs, tubers, and other underground organs of plants, different examples being, as a rule, chosen in the various years. The double function, reproductive and food storage, of these underground organs should be discovered by the pupils. Tests for starch and sugar should be explained and applied; and the importance of these substances to the resting and growing parts of plants respectively should be ascertained by the pupils. Lessons should be given on the work of leaves, but, as this is fully explained in most text-books, it need not be referred to in any detail here.

Life History of the Little Celandine.

The life history of some common wild plant should be studied. The little celandine, which is abundant in damp woods and hedgerows, will serve this purpose excellently. The heart-shaped glossy leaves of the plant are easily distinguished in very early spring, and its golden

starlike flowers make the woods and hedge banks gay at a time when most other plants are hardly awake from their winter sleep.

The flowers have three or four green coverings on the outside, which keep the flower-bud warm and dry. Within these are eight or nine bright golden petals, whose bright colours attract bees, wasps, and flies on warm spring days. At the base of each petal is a little honey-bag. There is sufficient honey in each in warm sunshiny weather to give the sensation of sweetness to the tongue. The insects which visit the flower suck up this nectar. They should be watched while at work. They alight on the flower, settle themselves in the middle with their heads dipping downwards to the honey glands, and gradually turn round as they visit each petal. The insects stand on the stamens, of which there is a large number. Each stamen consists of a yellow stalk and a yellow knob. These knobs contain yellow dust called pollen, which sticks to the legs and undersides of the body of the insects as they gather the honey from the petals. The younger stamens in the middle of a flower are not yet ripe—that is, they have not yet burst and shed their pollen. In older flowers, where the central stamens are ripe, the green seed-boxes or ovaries may be seen. At the top of each is a little sticky place, with probably some pollen sticking to most of them. How did the pollen get there? Have the insects brought it? Would pollen get there if the young flowers were so covered with thin muslin that the insects could not visit them? Why could it not? Do such flowers ever ripen seed? Does the bee perform any service to the flower in return for the honey it gets?

The flowers should be noted on fine, warm days, and on wet or sunless days. The pupils should not experience

much difficulty in finding what advantage it is to the plant that its flowers are open on sunny days, and closed on sunless days when rain threatens or falls. What other spring flowers open and close in the same way? What spring flowers do not? If the teacher directs the attention of his pupils to such spring flowers as the little celandine, the crocus, the tulip, the snowdrop, the violet, and the daffodil, the pupils should form the hypothesis that upright spring flowers have the power of opening and closing, and that spring flowers which have not this power droop or bend over and thus protect their inner floral parts from rain.

The way in which the flower stalks of the little celandine curl over as its fruits and seeds are ripening, the thick skin of the leaves of the plant when contrasted with the thin skin of the leaves of blue-bells and some other plants which grow in more shady places, and the fibrous roots, all furnish exercises in observation and deduction for the pupils.

The manner of reproduction of the plant is an important point. The starchy tubers, each with a winter bud, must be examined and experimented upon. Seeds must be gathered when ripe in June, planted in damp soil, and the results of germination carefully noted. In certain districts it is said that the seeds of the plant do not germinate. This is a point worth testing in all school districts. The seeds germinate in Cheshire and Somerset, whatever they may do elsewhere; and, in any case, the plant reproduces itself very freely by its tubers and winter buds; so that, if the spring be cold and wet and seeds then fail to ripen, the loss to the plant of reproductive power is not a serious one.

Growth Movements of the Dandelion.

The growth movements of the dandelion provide excellent material for testing the powers of observation and inference of the senior class.

The relative position of the stamens, style, and stigma of florets in various stages of growth should be noted and carefully drawn. Attention should then be confined to one particular floret, and the pupils should find out that each floret passes through the various stages previously observed. The time taken to pass through each stage should be written down. Pupils of our own noticed the stage where the style and stigma were wholly within the anther-tube. Two days later, the style was peeping through the tube, and pollen-grains were adhering to the outside of the style. In two days more the stigmas were outspread, and more pollen grains were on the outer and under sides of the style and stigma. Two days later still, the arms of the stigma were bent completely round, and thus pollen grains were sticking to the upper sides of the tip of the stigma. From such observations, and from observing insects at work on the flowers, the pupils are placed in a position to decide for themselves whether the dandelion is insect-pollinated or self-pollinated or both.

The movements of the scape or naked stalk of the dandelion should be similarly studied. The erect position when the plant is in full flower, the prostrate position when the flowers have faded and the fruits are still unripe, and the erect scape when the fruits are fully ripe should be observed and drawn, and the time that elapses between each stage should be carefully noted, and the benefit which the plant obtains from these devices should be elicited from the pupils.

The Ripe Fruits.

The movements of the ripe fruits themselves should also be closely watched. The fruit-head consists of a number of individual fruits arranged like parachutes. The lengthening of the stalks of these silky parachute-like fruits should be studied in the way indicated above, and also the opening and

shutting of the silky hairs of the parachute during fine and wet weather.

Other Work. The functions of roots, stems, buds, leaves, and flowers of plants should all have been studied to some extent by pupils who have worked at natural history from the earliest to the latest school-year.

The habits and mode of life of common examples of the chief classes of animals, such as a mammal, a bird, a frog, a fish, an insect, a snail, an earthworm, should also have been studied, as well as the chief functions of the higher animals, such as respiration, circulation, and digestion. In connection with the latter work, lessons should be given on the elementary principles of hygiene. A word of caution is here necessary. The work thus outlined for the pupils of the later years is based on the assumption that they have performed the work outlined for the intermediate and earlier years, and have therefore advanced considerably in the powers of observation and of drawing inferences and arriving at general conclusions. Such topics should not be taken with even the older pupils in a school which is just beginning nature study, and in which consequently no previous work in the subject has been done.

The following books are recommended to the teacher :—

Furneaux : Certificate Biology (especially chapters on Insects)	2/-	(Clive).
Furneaux : First Stage Biology	2/-	(Clive).
Ganong : The Teaching Botanist ...	5/-	(Macmillan).
Hodge : Nature Study and Life	7/-	(Ginn).
ughes-Gibb : How Plants Live and Work	2/6	(Griffin and Co.).
Miall : House, Garden, and Field ...	4/6	(Arnold, Leeds).
Miall : Object Lessons from Nature ...	3/-	(Cassell).
Miall : Round the Year	3/6	(Macmillan).

Osterhaut: Experiments with Plants ... 5/- (Macmillan).
Scott: Nature Study and the Child ... 6/- (Isbister).
Agricultural Education Committee: Leaflets on Nature Knowledge ... (London).
Cornell University, Ithaca, U.S.A.: Leaflets on Nature Study issued to teachers and young pupils.

CHAPTER XIII.

THE TEACHING OF MATHEMATICS.[1]

Mathematics in Relation to Life.

1. MATHEMATICS, at least that branch of it known as arithmetic, has perhaps been taught the most thoroughly of all subjects in primary schools. There has always been a strong feeling that a grounding in arithmetic is a sound preparation for effective and useful living. Of this there can be little doubt. Hardly any branch of human activity exists in which the measurement of form, position, or quantity is not required, and the more such activity advances in complexity and demands organised scientific consideration the more is exact mathematical measurement essential to successful effort. For all matter has position, shape, and size, and the movement of matter under the influence of force is determined in direction, space, and time. From this it follows that the successful and economical adaptation of the material environment to our wants and desires necessitates a more or less exact determination of the position, shape, and size of material bodies, and a calculation of the character and amount of force required to bring them from one condition to another.

The art of mathematics, then, is the art of economical living, of living without waste, of determining exactly in position, form, and quantity what you require and precisely fitting your means to accomplish your aims in the most

[1] By W. P. Welpton, B.Sc.

effective manner, whether it be in getting the utmost out of a weekly wage, or in building a bridge to span a mighty river. Social life, indeed, would break down, or rather it would never have risen to its present complex organisation, if mathematics did not make equivalent exchanges of goods possible by providing means for calculating values.

Mathematics in the Primary School.

The position of mathematics in life activity being determined, it simply remains to decide the kind and amount of mathematics required by the pupils of the primary school. What is taught must fit them for their future lives. At least enough must be taught to make them effective and economical managers of households, whilst still more must be included to render possible an intelligent and critical interest in municipal and national finance. To satisfy such needs would not make any great demands on the time-table. Little would be required beyond the four rules, the tables of money, weights, and measures in common use, the manipulation of simple fractions and decimals, with proportion and percentages, and their application to problems of domestic, municipal, or national interest.

The work of the primary school, however, is more than this. It should not only provide for the exigencies of domestic and social life, but should secure a sufficiently broad basis for future utilitarian life. Certainly it is no part of the work of the primary school to give any specialised training for any particular trade or business, still it is quite within its scope to lay a broad foundation on which any such future specialised training may be built. Most crafts, trades, and professions require skill in some form of measurement, and ability in calculation—an accuracy in skill and an ability in calculation beyond those required for ordinary domestic and social life. A preparation for such skill and ability must be provided by the primary school,

and this must be of a sufficiently broad, advanced, and practical character to make it possible for the pupils on leaving school to take advantage of any training for a special trade or business they may afterwards receive, either in trade or technical school, or in the workshop itself.

Something more, then, is required than the theory of arithmetic and geometry. Practical work is essential both in giving some skill in measuring such things as space, weights and densities, and in rendering the theory of arithmetic and geometry intelligible. But, above all, it is only by practical work in measuring bodies of different kinds and with respect to different attributes that the pupil can be brought into effective relation to his material world. He must realise that successful work depends on exact measurement, and for this to be a guiding principle of his future conduct it must become part of his mental and moral fibre by constant and thorough practice throughout growing youth.

Mathematics in Child Life.

However much the demands of the child's future life appeal to the teacher, they appeal but little to the boy as he passes from infancy to youth, although as he grows older his imagination begins to dwell more and more on future possibilities. It is, however, the wants and needs and desires of his present life that absorb him. He can only give a willing interest to what he feels to be of value now and to have some practical motive—in short, to what will give him some better command over his present activities. And this, indeed, is the true aim of school instruction. However much future life, its possibilities and circumstances, be the aim of the teacher, such aim is only to be attained by inspiring the pupil to live his present life as fully, as rationally, and as thoroughly as he can. To live through

a full complete life of child, of boy, and of youth to manhood is the best and only fitting preparation for a true life as a man.

Mathematical teaching, then, should appeal to the interests of boyhood, but in such a way as to develop them to something higher, more exact, and more perfect. The mode of teaching should by tactful criticism and sympathetic encouragement inspire the pupil to realise his present practical interests more thoroughly and more rationally. For example, one of the most powerful of boyish instincts is that of construction. He loves nothing more than to make things. To draw out such an instinct, to direct and guide it to a higher and more rational plane, is part of the work of mathematical teaching. Let us suppose he wishes to make a box. To do this in a thorough and rational manner would demand an inquiry into the nature and construction of a right angle, into the exact determination of length, area, cubical contents and weight, besides requiring a knowledge of woods and manipulative skill in working with them. Indeed, a whole system of geometric and arithmetical knowledge is necessary before such a desire can be adequately realised. It is in perfecting such activities as this that mathematical teaching makes its connection with the present life and interests of the pupils, and it is out of such practical problems as this that the theory of mathematics should spring. Theory exists simply to render practice more intelligent and rational, more organised and exact. Hence its problems should arise out of the demands made by practical work, and should lead back to such work to make it more effective.

Such, then, must be the harmonious relations between the aim of the teacher and the aim of the pupil, between the theory and the practice of mathematics. The rational and full future life of manhood is the evolution of the

rational and full life of the boy, whilst theory springs and develops out of practice. Only by carrying out this principle with judgment, tact, and sympathy in his teaching can the teacher induce the pupil to bring real interest and intelligent appreciation to his work. Only so will the child come to understand mathematical conceptions in their fulness. We know clearly and completely only what we can apply effectively, and this principle holds in the realm of practical as well as in that of theoretical application. By actually working with a thing we discover its limitations, what it really is, and how much we can and cannot do with it. Without such a connection with practice theory is merely something in the air, an intangible elusive myth.

Mathematics as a Mental Discipline.

2. We must now consider one view of mathematical training that is very widely held. It is almost universally believed that mathematics provides an excellent mental discipline, especially in reasoning; that it sharpens the intellect, making it more alert and active, and that it leads to habits of concentration and application. That those who work thoroughly through a course of mathematics do benefit by it mentally there can be little doubt, but there is much uncertainty as to the exact nature of that benefit. That it provides no direct general training in reasoning is very certain. Of that modern psychology has no doubt. There is no faculty of reasoning which when sharpened and tempered by mathematics can be applied to reasoning in other matters. A good mathematician is not necessarily a good statesman or a sound psychologist, any more than a skilled painter is on that account an expert tea-taster, though both are good observers in their own particular sphere. Yet by mathematics a power has been gained that is universally

applicable in all mental operations. The activity of attention is fundamental to all intellectual life, and the power of concentration and application developed to a habit by mathematical work will lead a pupil to attack a new subject and to progress with it more effectively than if no such habit had been acquired.

The Training of a Critical Power.

Though mathematics has no direct and immediate effect in enabling a student to reason in other subjects, yet it has an indirect influence. It tends to render the mind more analytically critical in all its thought. More nearly than any other subject mathematics approaches the form of a perfect deductive science, in which every conclusion is inferred from evidence which can readily be brought to light and examined. Its conclusions are based either on facts definitely given by the circumstances of the case, or already known and proved with respect to it, or else assumed as axioms or postulates. Such facts are continually being systematically organised in its formal definitions explicitly and exactly stated in words, and its assumptions are continually being analysed into the simplest and most fundamental intuitions, and on these the whole structure of its proofs rests. Intelligently and thoroughly to study a series of such highly rigorous proofs and exact statements of ideas is to realise what is meant by valid thought and exact language, and such a standard once formed in the mind is bound to react in some measure on the general mode of thinking in other matters.

If, moreover, the teaching goes beyond this and leads the pupils not merely to reason about mathematical relations but to study the nature of the thought itself, to consider not only the statement of the definitions and axioms of mathematics but also their logical nature, not simply to reason out the proofs but to realise the valid nature of

those proofs, then a definitely conscious ideal of language and thought will have been formed which can be consciously applied to every matter of daily life. Continued exercises of such a character will develop the habit of examining critically conclusions arrived at and thus becoming conscious of their limitations and approximate accuracy. Such a critical power so developed should be a great help in guarding a pupil against ambiguities in language and fallacies in argument.

Some such logical training seems in this democratic age necessary for all. Public opinion now-a-days has so much influence in guiding the fortunes of a nation that a standard of valid and clear thought and a power to probe to the bottom of an argument and test its worth is a very necessary, but still very rare, equipment for every citizen.

Suitability of Mathematics to train Critical Power.

It might with some show of justice be said that science or history could just as easily give this intellectual training. Some such training it is quite certain they can give, but mathematics occupies a special place in this respect. Mathematics is above all other subjects of school study an exact and precise science, its reasonings form a standard towards which all other sciences look with envy. Hence the study of mathematics will consciously and unconsciously set up an ideal of valid thought more perfect than that given by the study of less exact bodies of knowledge. On this ground alone mathematics would hold its own as a mental discipline, yet it has further claims for special consideration. The study of the forms of thought in mathematics is specially appropriate for pupils in primary schools. The relations involved are not complex and involved as they are in the case of the natural and social sciences, being simply those of measurement and form. The child from his early years is constantly acting on

his perceptions of size and shape, and soon learns to abstract those qualities and think of them by themselves. Having such simple and familiar relations to deal with he can advance with comparative rapidity to those higher and more abstract workings of the intelligence peculiar to deductive reasoning, and without great difficulty can make the further abstraction of considering the form of thought itself.

In history and in natural science the case is very different. In these subjects the relations are complex, involved, and less familiar, and hence not easily isolated in thought; consequently the pupil's stay in the lower stages of intelligence is more protracted. He spends a longer time in accumulating facts and becoming familiar with them, while the work of analysing these facts is decidedly more difficult. Hence the pupil in a primary school never advances in these subjects to that stage of intelligence in which deductive reasoning predominates. For these reasons mathematics stands out pre-eminently as the subject whose study in the primary school lends itself most readily to the formation of definite standards of thought, and to the training in habits of critical analysis.

It is interesting to know that the importance of such intellectual training has not escaped the notice of some of our most prominent statesmen. In the course of a public address[1] Mr. John Morley, recognising perhaps how easily the public can be swayed this way or that by any passing wind, recommended that a judicial habit of mind be trained by a critical study of certain selected law cases of general interest. He thought it well that people in this age should have some clear notions as to the value of evidence and how far conclusions could be justified by the evidence in any particular case. There seems, however, no reason why

[1] Essay on Popular Culture in *Critical Miscellanies*, Vol. III.

teachers should go beyond the subject-matter of the school curriculum to provide such a training.

Mathematics, as we have seen, offers a good field for such a critical examination, and much may be said in favour of the critical study of the form of reasoning employed in natural science, since this is largely inductive, while mathematical reasoning is deductive. It would be a useful exercise to examine and weigh selected arguments from such a book as Darwin's *Voyage of the Beagle*, to lead the pupils to realise with what care observed facts have to be examined and compared before general conclusions can justly be inferred from them, and how tentatively such conclusions should be held. In such ways is promoted an attitude of mind which should be brought to bear on the forming of conclusions in all lessons in natural science.

Interest of Pupils in Intellectual Conquest.

Pupils, especially when young, cannot be expected to be interested in mathematics merely as a mental discipline, though when future life and its purposes begin to loom immediately ahead they can to some extent appreciate this aspect of the study. The practical view of mathematics will always take precedence with the boy, and hence the mental discipline side of the teaching must be incidental and not be forced too much to the front. Pupils can, however, be interested to some degree in solving problems for the simple pleasure of conquest, a pleasure analogous to the delight in such games as chess and draughts. Pleasure is in the intellectual exercise itself and in the victories such exercise wins. Most of us have felt the glow of pride in evolving a 'neat' proof. Such interest, however, is only sustained by feelings of confidence, power, and elation, which are the rewards of success. There is a sense of victory in overcoming difficulties and knowing oneself to be superior to them. To make use of such forms of interest in mathematical

teaching the teacher must incite intellectual effort by work sufficiently difficult to call it forth. Difficulties must be faced by the pupils. Variety and originality in the problems are essential. Each new problem should present some fresh element on which thought may operate. Quick, neat methods of working should be the ideal, clumsy roundabout methods should be scorned. The mechanical solution of sums and problems worked according to certain known types soon becomes a monotonous, uninspiring drudgery.

The Connection between Arithmetic and Geometry.

3. Mathematics in the primary school divides itself into two parts—Arithmetic, the science and art of measurement, and Geometry, the theory and construction of form. No hard and fast line of demarcation separates the teaching of these two branches. To determine the position, shape and size of material objects necessitates the measuring of lengths, areas, and volumes. Besides this, the geometrical representation of shape in the form of plans, elevations and isometric drawings; of varying quantities such as temperature and barometric pressure by means of graphs; of forces and velocities by lines, involves not only geometric but arithmetical considerations.

A very close connection should, then, be maintained between the teaching of arithmetic and the teaching of geometry. This, of course, is most possible in the practical work. The practical problems of life must deal at one and the same moment with the position, shape, and size of things, though in theoretic contemplation we may abstract the form from the size and give each our separate consideration. It will be convenient however to divide the discussion on the teaching of mathematics into (*a*) the Teaching of Arithmetic, (*b*) the Teaching of Geometry, although in considering practical applications diversions from one to the other will frequently be made.

In laying down courses of arithmetic and geometry it must constantly be borne in mind that no detailed scheme is applicable to every kind of school. The circumstances and needs of the scholars, the age at which their school life ends, whether they leave to go to work or to attend some higher school, are all factors that must decide the details of a course. The amount and kind of mathematics suitable for boys are not appropriate to girls. The power of abstract thinking seems to come later and in a weaker form in girls than in boys. To these considerations due weight must be given in drawing up courses of mathematical study for girls, and the scheme we are about to lay down, which is primarily intended for boys, should be modified accordingly. Again, in schools in working-class neighbourhoods more emphasis should be laid on practical measurements than on the theory of arithmetic and geometry, although the latter should not be altogether neglected. All that can here be done is to set forth the main outlines of a course which should be modified in the details to suit the special characteristics of each school.

Development of Arithmetic from Empiric to Rational.

4. In all natural mental development practice precedes theory, and a working notion is the germ of an exact conception. An exact conception is the final goal, and is the outcome of a careful analysis of the working notion, thus making thought more accurate and deductive, and practice more rational. On account of the simple and familiar character of arithmetical conceptions it is possible in the primary school to progress to this final goal of conceptual thinking and of a practice based on an exact knowledge of universal relations. Roughly speaking, then, there will be two stages in the teaching of arithmetic, but since exact conceptions do not spring into being at any definite moment of time, but are a gradual evolution from the

indefinite through various stages of clearness to the definite, there cannot be any exact point of time which divides the two stages. The stage of working notions grasped empirically will by gradual analysis evolve into the stage of exact conceptions grasped by the reason. Yet, remembering this restriction, it is convenient to consider the two stages—the Empirical and the Rational—separately. The period of school life when the one has distinctly passed into the other in mathematics may be roughly placed somewhere about the age of ten or eleven.

Aim of Empiric Stage.

5. The aim of the first or empiric stage in the teaching of arithmetic is to give the pupils a working notion of number, of its numeration and notation, and of the operations of addition, subtraction, multiplication, and division; to secure that these notions spring from the practice of measuring quantities of various kinds and lead back to it; and to make sure that a basis for effective future work is laid in a thorough memorising of all the necessary tables, and in making quite automatic the different operations. Pupils in this stage cannot be expected thoroughly to understand everything they do. To spend time at the beginning in making every notion and operation perfectly clear to the understanding is to waste time. For, after all, understanding is relative to the stage of intelligence, and it is more important that by constant practice the power of rapid, accurate, and confident calculation be gained than that every sum should form the text for a sermon on notation and the theory of calculation. This, however, is not an argument for rule-of-thumb working. Nothing could be farther from our intention and nothing is more deadening than such a procedure. We simply wish to emphasise that all that can be expected at this stage is a working notion, and not a perfectly definite

and clear conception. A working notion means a notion understood up to a certain point, and which, as the name suggests, is used in working. It would seem, then, that intelligence is rather to be employed in the application of such a notion to practical affairs than in the understanding of its exact content and limitations.

Measurement.

6. Number is a notion that springs out of measuring. In measuring a quantity, whether it be a collection of things, or size, or weight, the mind starts with the whole thing to be evaluated and divides it into parts, and the quantity is measured by counting the number of the parts in the whole.

The division into parts may be a physical one, as in counting a pile of pence, or only mental, as in measuring the length of a wall. Naturally with young pupils physical division aids the mind in its work of thinking the whole as made of parts. It is easier for a child to think of a cube as being made of eight smaller cubes when the cube can be physically divided than when the division has to be left to the imagination. Physical distinctions, however, may be so pronounced that they increase the difficulty the small child has in thinking the parts into a whole. He cannot at first think of a table, a pen, and the room as a whole of three objects. The task of bringing three such different things together into one group is too much for his immature powers of abstraction. For this reason the child needs aid in his first dealings with number. Things to be counted should be as much alike as possible, and when they are put together to make a whole the continuity of the whole should be obvious to his eye. It is advisable, therefore, that the abacus with which he is taught number and the operations with number should not be made of a number of balls but of a number of cubes, so that when placed together they form a visibly continuous whole.

Number.

The perception of number, then, arises out of an activity of the mind: it is the mind working on what it sees and handles or hears, and evaluating it in terms of something familiar and convenient. It is not, however, mere seeing and handling and hearing. The mere sensation of six separate sounds would never give the idea of six unless the mind thought the six into a whole and yet kept each one distinct. There is a double movement, an analysis of a whole into parts, and a synthesis of the parts into a whole, and the mind performs such an operation on what it sees and hears and handles when an evaluation of a whole is necessary for the exact attainment of some end.

Number, then, takes its root in practical working with material things to adapt them more exactly and perfectly to our ends. Our forefathers had to plot out their land, so they invented the rod or pole; to count their cattle, so they invented number. Practical necessity drove them to measuring, and a similar necessity should drive children into their own first crude attempts. The early teaching of number should be entirely in connection with the construction with bricks and sticks of various objects such as castles, houses, churches, gardens. The children should be encouraged to estimate the number of bricks required for this side or for that pillar, and to divide the bricks into two or four parts according to the number of walls to be built.

Measurement we have seen to be the dividing of a whole into parts, and the counting the parts to evaluate the whole. This principle of measuring should be carried out from the beginning in all teaching of number. The child should take a whole thing, and with his hands divide it into parts. At first it will be two parts, then three, then more. To begin with one object and proceed to two by

adding another, and so on, is not measuring. No true idea of number or of unit can come out of such a mode of teaching. The Froebellian cube should not be built up out of its parts by adding one to another, it should be taken as a whole and measured by dividing it into two parts, then each of these into two, then each of these again into two. Similar operations of dividing wholes into parts should be performed with all the material used in kindergarten operations—squares, triangles, collections of beads, and sticks.

Units.

In thus beginning with a whole and dividing it into parts emphasis is laid on the true idea of a unit. A unit is a part of a whole used to measure that whole. It may be a single object, as in counting fifteen apples; or a group of objects, as in counting in scores or dozens; or even a fraction of an object, as in $\frac{3}{4}$ of an apple, where the unit is $\frac{1}{4}$ of the apple, and in 5 % of the cost price, where $\frac{1}{100}$th of the cost price is the unit. The size of the unit may change at pleasure or may vary from an inch or a fraction of an inch to a multiple of a mile, which is the unit in the problem: How many days will a man take to walk from Leeds to London at twenty miles a day?

From the very beginning care must be taken in teaching number lest the pupil acquire the notion that things are always measured in ones, and this idea is sure to be formed if the synthetic method of adding one to one, and so on, be employed. He should be practised in dividing the foot-rule into two, three, four, and six parts; his desk into two or three lengths of the foot-rule; a pile of beads or beans into similar numbers of parts. The size of the parts is immaterial; he is not at first asked to measure these: he is dealing with their number.

Such a mode of beginning will not confine the pupil for

many months to dealing with numbers of objects up to ten. Much larger numbers can be dealt with by separating them into groups. When a child has mastered two by dividing things into two parts he has the material for grasping four, for four is simply two groups of two; after which he can proceed to deal with three. Similarly, when he has mastered four he can understand four groups of four, although he cannot grasp it as one ten and six ones.

Numeration.

His power over large numbers is much increased when he has been taught ten. The whole range of number up to one hundred is then open to him. He can group things in tens—as two tens, three tens, and so on—and can readily pass to the more conventional language, twenty and thirty. It may be argued that such a number as one hundred is not within the mental grasp of a young child. This is true if by 'mentally grasping' a hundred is meant visualising it as one hundred separate things. Even an adult cannot do this. We think a large number by grouping it. Ninety-six is nine tens and six ones, or twelve eights, or eight twelves. Such power of grouping the child can gain, and should from the beginning be encouraged to extend. When he has learnt ten he can think of ten groups of ten in each group, and in that way can deal with considerable numbers of things.

In dividing collections of objects into groups of ten he frequently finds one, two, three, and more objects over, and so the numbers are filled up from 10 to 20, 20 to 30, and so on to 100. The names of these numbers, except those from eleven to nineteen, present little difficulty. They are readily understood as indicating the system of grouping; thus eighty-six is eight tens and six ones. Care is constantly required at first in dealing with names like fourteen. The children are apt to confuse fourteen and forty, thinking that each means four tens.

Notation. By such a method of teaching, the language of number presents few difficulties. It merely emphasises the grouping in tens. The verbal language, as has been shown, becomes clear with very little help, and when written notation is begun it will appear as a natural expression for the mode of grouping. It does not seem necessary, then, to adopt any special devices for teaching the ordinary tens notation.

Addition and Subtraction. 7. Addition and subtraction arise out of comparison of things. At first it is a crude comparison of this being more than that—larger or smaller, longer or shorter. When the idea of number has arisen this comparison can become more exact. The ideas of subtraction and addition arise at the same time, the one being the inverse of the other. The notion of 7 and 5 together making 12 involves the notions of 12 being 5 more than 7, and 7 more than 5. Indeed, to add together 7 and 5 and to find the difference between 12 and 7 is the same process of counting from 7 up to 12, only in the first case the final attention is on the aggregate 12 and in the latter on the difference 5. Thus, subtraction should always be taught as the inverse of addition ; that is, as the process of finding the number which added to the less will make the greater.

Multiplication and Division. 8. No fundamental difference exists between addition and multiplication or between subtraction and division. Multiplication is addition in groups of more than one and division is subtraction in groups of more than one. Division, then, is the inverse process to multiplication. Though fundamentally the same process of counting, multiplication and division are an advance on addition and subtraction. The idea of a quantity being a number of times another quantity, which is the essence of the two former, is not present in the

two latter. There is distinctly brought to consciousness in multiplication and division the idea of ratio or 'number of times,' an idea which finds its fullest expression in fractions.

Though multiplication and division are an advance on addition and subtraction, there is no need to delay the teaching of the former until the latter are mastered. In working with cubes, sticks, and beans, the ideas of a whole being divided into parts and of the whole being a number of times the parts will soon be grasped, and only systematic encouragement is needed for such an idea to take organised form as multiplication, division, and simple fractions. Then the four fundamental operations can progress side by side. For example, in considering six objects—cubes, sticks, or beans—they may be measured as two three's or three two's; they may be divided into parts of five and one, four and two, three and three; and exercises may be founded on these physical operations, which can be expressed in the form—

$$6 = 5 + 1 = 4 + 2 = 3 + 3 = 2 + 2 + 2.$$

$$6 = 1 + 5 = 2 + 4 = 3 + 3 = 2 + 2 + 2.$$

$$6 - 5 = 1, \quad 6 - 4 = 2, \quad 6 - 3 = 3,$$
$$6 - 2 = 4, \quad 6 - 1 = 5.$$

$$6 \div 2 = 3, \quad 6 \div 3 = 2.$$
$$2 \times 3 = 6, \quad 3 \times 2 = 6.$$

$$\tfrac{1}{2} \text{ of } 6 = 3, \quad \tfrac{1}{3} \text{ of } 6 = 2.$$

This method, however, must not be confused with the mode of teaching number which begins with the number one and takes each number up to twenty in succession, subjecting each to a rigid analysis. Even if the analysis be performed with the aid of objects, it cannot lead to

true ideas of number and unit because it is not founded on measuring a whole. It confines the unit to one thing, and thus limits the activity of the child's mind in grasping large numbers by means of grouping. It leads to a dry uninteresting grind for months at an endless analysis of a few numbers, easily learnt in themselves, and from which the child can, and should, progress to grasping larger numbers. All that can be said for such a method —and this, indeed, is its main attraction—is that it is systematic, and aims at so memorising the component parts of numbers that calculation becomes automatic.

Systematising and Memorising.

9. Systematising of the results of the child's manipulation of cubes and sticks is an essential part of good teaching, and should be followed by effective memorising. All future work depends on the success of such teaching.

Addition and Subtraction.

The child should know by heart the composition of every number up to twenty, so that with quickness, accuracy, and confidence he can perform the addition and subtraction of smaller numbers. There should be no hesitation in saying that the sum of 7 and 8 is 15, or that it requires 6 to be added to 8 to make 14. All such operations within the limits of twenty should, by frequent and continual practice, be made automatic. On such an automatic basis the pupil can advance with success to operating with numbers up to one hundred. Such operations he should be taught to perform mentally. Thus in adding 29 and 35 he will think: 29 and 30 is 59 and 5 more is 64; and in subtracting 38 from 76 he will think 8 added to 38 makes 46 and 30 more makes 76. Rapid mental work of this kind, a little at a time, but frequent and varied in character so as to sustain interest, will soon make all calculating within a hundred quite automatic.

Multiplication and Division.

At the same time the multiplication tables should be built up from the results of his experience in measuring the various kinds of material he has been using. A great help in this is a knowledge of the law of commutation, though its name should not be used. By grouping a number of objects it is made clear to the child that 3 things taken 4 times equals 4 things taken 3 times. The principle should be mastered by examining several such cases of grouping. By applying it the labour of making the tables will be reduced by at least one half. The ten times table should be the first to be learned. The child can learn it immediately he has mastered grouping in tens.

As the table is built up it should be effectively memorised. Its use should be made perfectly automatic. Without such arithmetical automatism progress will be but halting and slow, and will continually break down at crucial moments. Nothing so worries and disheartens a teacher as to find his pupils slow, stumbling, and wanting in confidence because the early memorising of the tables has been faulty, and this is equally discouraging to the pupils themselves.

It is not advisable to learn the tables as tables. The frequent repetition of a table as a table makes the saying of it as a whole habitual, so that frequently a pupil cannot give any particular line without starting from the beginning, and that, of course, is not to have a command of the table. Each line of the table should be known independently of every other line, and this can never be secured if the lines are not memorised separately. Moreover 4 and 9 should lead automatically to the product 36, whether one thinks of 4 or of 9 first; similarly 36 should lead automatically to the factors 4 and 9, as well as 12 and 3, and 6 and 6. Such memorising is best done by

constant and frequent practice of each item or a few items at a time in quickly working varied mental problems. Each statement should be grasped in all its aspects and used in many different ways. For example, the exercises on $3 \times 4 = 12$ might be such as—

Divide 12 nuts among 4 boys.
Divide 12 nuts into heaps of 4 nuts each.
3 boys had 4 nuts each; how many altogether?
4 boys had 3 nuts each; how many altogether?
Find a third of 12 and a quarter of 12.
What is 3 tens taken 4 times; 4 dozen taken 3 times?
How many thirties in twelve tens?
How many times is 36 contained in twelve dozen?
Divide twelve quarters by three and by four.
Give all the factors of 12.

Such practice as this for a few minutes daily will ultimately lead to multiplication and division with numbers up to twelve becoming quite automatic, and until such habituation is reached no good teacher will rest content.

Measures of Length, Weight, Money, and Time.

The child's measurements, however, will not be confined to counting objects in ones or in groups. They should extend over as wide a range as possible. Lengths, weights, and money should be in regular use both in actual practice and as the basis of problems. The operations with these should be systematised in tables in a manner similar to that by which the multiplication tables were constructed. These tables should be the outcome of actually measuring lengths and weights, and of dealing with money represented by counters.

The foot-rule is an excellent instrument upon which to base a large variety of measurements and calculations. It has already been shown how it can be measured as 2 s'x

inches, 3 four inches, 4 three inches, 6 two inches. Similar operations can be performed with a yard measure, which can be measured in feet, or in units of 9, 6, 4, 3, or 2 inches. These results, worked with the actual yard-measure and its divisions before them, can be made the basis of a great variety of practice in multiplication and division. Similar practice can be obtained with weights and with money.

Throughout the whole of this first period, then, the actual practical measurements and the problems based on such measurements will be in relation to the systems of measurement in common use in daily life.

The tables of weights, lengths, money, and time should be effectively memorised in such a way that a child can use automatically the fractional parts of a shilling and pound, of a foot and yard, of an ounce, pound, and stone, and of an hour and day.

Reduction from one Unit to Another.

10. Working with these tables involves the changing from one unit to another. This change will come as no surprise to pupils who have been consistently taught to regard a unit as any group of things convenient for measurement, and its expression in a distinct notation will satisfy a felt want. To group things into tens, dozens, or scores, pence into shillings and pounds, inches into feet, and ounces into pounds avoirdupois, to change from one kind of grouping into another, will only be a natural development of the early teaching. Carrying from ones to tens, pence to shillings, inches to feet will not seem to be juggling with figures, but will appear as a greater convenience and as the natural and proper thing to do.

Practice in changing units should be as wide and as varied as possible and should call into play all the fractional parts of shilling and pound, foot and yard, ounce

and pound avoirdupois, day, hour, and minute. Mental work of this kind increasing in difficulty will form an excellent preparation for the longer calculations by Simple and Compound Practice, which are only more complex forms of the same kind of operation.

In calculating by 'Practice' the pupils should be taught to work either by means of addition or subtraction, whichever is found to be the more convenient; for example, 85 articles at 17/6 = 85 times (10/- + 5/- + 2/6), but 85 times (£1 − 2/6) will be more quickly worked.

Written Language of Arithmetic.

11. Almost the whole of the teaching of arithmetic to the younger pupils will be mental work, and with numbers within the limits of one hundred they should be able to work a very great variety of problems involving operations with all the rules and tables. Gradually, however, the written forms of arithmetical language must be taught, at first by being used on the blackboard, afterwards by the pupils on paper. The written work will be exactly of the same character, difficulty, and complexity as the mental work, until the pupils become quite familiarised with the written form of arithmetical language. It is thus at the beginning, not a question of teaching a new kind of work, but only of teaching a new language for what can already be done mentally and expressed in verbal language. All forms of mathematical symbols should be taught, such as $+$, $-$, $\times$, $\div$, $=$, and the fractional form as in $\frac{1}{2}$.

When the pupils have become quite familiarised with this written language they should advance to working sums and problems of greater length and complexity. The difficulty of dealing mentally with large numbers and complex operations will be an obvious justification to the child for written arithmetic, whilst its convenience as a means of communicating arithmetical processes and results to others

may easily be made manifest to him. In written work only those operations and steps should be given which the pupil finds necessary either in assisting his memory or in making clear to a reader the line of mathematical reasoning by which he reaches his results.

The method of working addition, subtraction, multiplication, and division in written work should always be the most convenient, not simply for present work, but in reference to future needs.

Subtraction.

Many methods are employed in working subtraction, and pupils can readily understand and gain proficiency in any of them. The most convenient method for future needs is that of complementary addition. This method follows naturally from considering subtraction as the inverse operation of addition, and this we have seen is the most logical way of thinking subtraction. In finding the difference between 29 and 52 this method proceeds by asking: What must be added to 29 to make 52? Beginning with the ones column first, the child should think 9 and 3 is 12, giving 1 ten to carry to the 2 tens and requiring 2 tens more to make 5 tens.

Multiplication.

In written multiplication it is usual to begin multiplying by the ones figure first and to proceed with the figures of higher value in order. The most convenient method, however, is to begin with the figure of greatest place value, because such a mode of working is essential to the teaching of approximations, which should come later in school life. The method is shown as follows—

$$\begin{array}{r} 785 \\ 32 \\ \hline 2355 \\ 1570 \\ \hline 25120 \\ \hline \end{array}$$

Division.

Division we have seen to be a mode of subtraction. In dividing 2892 by 6 we proceed to subtract in sixes, 4 hundred sixes being subtracted first, then 8 tens of sixes, and finally 2 sixes. This operation of subtracting is fully set forth in the long form of expression, and hence this form as being more complete than the shortened form should precede it in the teaching.

$$\begin{array}{r|l} & 482 \\ \hline 6 & 2892 \\ & \underline{24} \\ & \;\;49 \\ & \;\;\underline{48} \\ & \;\;\;\;12 \\ & \;\;\;\;\underline{12} \end{array}$$

When the nature of this operation has been grasped and the pupils have become familiar with the steps the long form of expression may be replaced by the shortened form. On this plan of teaching the pupils have no difficulty in understanding long division when its use is demanded by a large divisor. The placing the figures of the quotient above the figures of corresponding place value in the dividend makes it easier for the child to realise the place value of each figure and is the surest means of avoiding the omission of 0 when it occurs in the quotient.

Problems.

In working problems the writing should show the important steps of the solution, and the numbers written should be sufficiently labelled to make their application clear. Nothing, however, of the mechanical calculation should be written which can be done mentally.

It is important in working problems that the pupils should think out the whole method of the solution before they put pen to paper, and should do this not simply in a concrete form as applying to this particular example, but in a general form as applying to all problems of this kind. Doing this will encourage their advance to general forms of expression from which the step to symbolic expression will be easy. By the pupils beginning thus early to use general forms of expression in simple cases the advance to

generalised arithmetic, and finally to algebra, will be made very gradual, besides which these symbolic forms will then appear as a shorter and more convenient form than words. A suitable method of written expression for problems which will secure all these advantages is illustrated in the following example: A man buys 8 lbs. of tea at 3s. per lb. and sells it for £2. What is his gain?

Gain = Selling Price — Cost Price.
= 40s. — 24s. = 16s.

Drill in Mental and Written Arithmetic.

12. Just as the mechanical part of mental work can only become automatic by constant and frequent practice, so the mechanical part of written work requires a large amount of practice to secure quick, accurate, and confident manipulation of figures. This part of the teaching of arithmetic may suitably be called 'drill,' for its object is to produce perfect mechanism. Perfect written work of this character can only result from a good basis of mental automatism, and every means should be employed to make mental calculation as unhesitating, as accurate, and as rapid as possible. A few minutes at the beginning of every arithmetic lesson should be devoted to this mental drill, which should be made as varied and progressive as the ingenuity of the teacher can devise. In written work, as has been said, the pupils should not be permitted to work calculations on paper that they are able to do mentally. In this way the memory for figures and the concentration of attention on working with them will be developed. Drill in written work will be less frequent than mental drill, but it is a form of exercise that is at times useful. Long calculations involving the four rules will encourage habits of care and accuracy, and give such practice in manipulating figures as will lead to rapidity and confidence.

Practical Arithmetic.

13. It has been our desire so far to show that the teaching of arithmetic should arise out of the art of measuring and lead back to it. In the primary teaching of number it is hoped that we have indicated sufficiently clearly how the theory of number should develop out of the child's practical constructions. This connection between the practical activities of the child and the teaching of arithmetic should be maintained throughout. The teaching should endeavour at all stages to give the pupil a more exact command over the problems of practical life. With this principle in view we have already advocated that the sums and problems to be worked should bear on the measurement of things in common daily use either in school, at home, or in the neighbourhood. The measurements should not be confined to those of money, but should extend to those of length, weight, cubic capacity, and time. Not only should these tables form the basis of mental and written work, but a considerable amount of practical measuring should give reality to theory.

Measurements of Length.

The foot-rule and yard-measure should be in frequent use in measuring the lengths, widths, and heights of desks, cupboards, windows, doors, walls, and other articles in the school or near it, and these measurements should be brought into problems for mental and written work requiring the operations of multiplication and division as well as those of addition and subtraction.

In measuring lengths the pupils should not always be dependent on the foot or yard measure, and they should be trained to judge distance with the eye with approximate accuracy. There are plenty of objects in the class-room and playground on which they can practise to this end. They should learn to estimate longer distances by stepping.

Drawing of Plans of Outlines to Scale.

The measurement of objects will lead on to, and be combined with, the expression of their shape in a plan. The meaning of a plan in expressing position and contour is taught in connection with the geography. The pupils should at first draw the plan of a cube, ink-well, or book, by tracing round the edge of the object, afterwards drawing their plans entirely from measurement. The idea of drawing to scale must be grasped early, for in the course on geography the form of a country or county has to be expressed by means of a small model and a small map, which should be examined side by side. No new idea is involved, for the pupils are quite familiar with pictures and photographs being smaller than the objects they represent, and are aware that the parts of the picture must be in proportion. As soon as they have grasped the principle that the proportion of the parts must be preserved they can begin drawing to scale. This will be about the third year.

To be of real value, drawing to scale should be from actual measurements of an object. The pupils should work out the scale to which the object should be drawn by comparing the size of the object with the size of the paper. Moreover, considerable ingenuity needs to be exercised in many cases in selecting the most suitable lines in the object for measurement. The aim of the pupils should be to take only those measurements which are absolutely essential. The greatest accuracy both in measuring and in drawing should be insisted on. This accuracy can be tested by the pupils making calculations from their drawings. A number of lines in the drawing not previously measured should be measured, and the length of the corresponding lines in the object calculated. By comparing the result of these calculations with the actual

measured lengths of the lines in the object some idea will be obtained of the accuracy of drawing or of measuring. The constructive ingenuity of the pupils can be exercised by their designing simple objects, such as a table, cupboard, or bookcase, to fit certain parts of the room, and suited for some definite purpose.

Measurements in Weight and Cubical Capacity.

Practical work in measuring weight and cubical capacity is not so easy to organise, but such practical work is necessary if the pupils are to realise fully the meaning of ounce and pound, pint and quart. By handling objects the pupils should be trained to estimate their approximate weight, and by looking at vessels to judge their probable capacity.

Measurements in Money.

A number of money counters should be in use, and interesting practice can be obtained by 'keeping shop.' In this exercise one pupil should come before the class with piles of counters for coins arranged in order of value. He has to imagine himself a grocer or draper or some other tradesman: other pupils in turn come out, and in imagination buy various articles, stating the amount they require and the price per pound, ounce, or yard they wish to pay. Then they present a coin and request change. The whole class should perform the calculation, and quickness and accuracy can be encouraged by allowing the first who calculates the change correctly to take the place of the shopkeeper until ousted by a quicker rival. The articles asked for should be those in common use, and the prices quoted those usually current, so that the pupils will become familiar with the value of common things, and acquire quickness in calculating the amount of a bill and the change required—an acquirement their parents will doubtless appreciate at its full value.

Aim of Rational Stage.

14. We have seen that by about the fifth year of school life the pupils should be advancing into the rational stage of arithmetic. They should, during the early years, have attained good working notions of quantity, unit, and ratio, though these terms should not have been submitted to them for exact examination, and should be quite familiar with notation, the four rules, and simple fractions, with all the tables in daily use and with operations on those tables.

These working notions should now be subjected to a rigid analysis, so that clear conceptions may be attained. The decimal notation and the fractional expression should be extended to their widest limits. With the fundamental notions of measuring and of the modes of expressing its results made definite and clear, the pupils will have a firm ground from which they can proceed, by strict deductive reasoning, into the higher branches of arithmetical measurement. In this higher stage new and more complex kinds of quantities have to be measured, requiring different kinds of units, but no new principles of measurement will be involved. The method of dealing with these quantities will need but a direct application of the principles now to be set forth. In this application, however, the new quantities to be measured must be carefully examined, their nature made clear, and the kind of unit necessary to measure them considered. For example, in measuring Simple Interest the pupils should first examine the relation of the interest to the principal and time in a particular case. They will find it varies directly with each, and are thus prepared to suggest an appropriate kind of unit for measuring interest, and to appreciate how the unit or rate of interest is a certain fraction of the principal paid yearly.

This method of teaching the new kinds of measurements in this stage must not be confused with the so-called 'Deduction from a number of examples' so frequently advocated. The two methods are diametrically opposed. The latter is in reality an Induction by Analogy, and in practice it too often degenerates into the mere familiarising the pupils with a rule by working a number of simple examples, the essential resemblances between the instances being never laid bare by a careful examination of any one case. It is by a close analysis of the nature of the quantity and the unit of measurement that a clear, definite, and general rule of working will be reasoned out by the pupils. This analysis can frequently be aided by considering a concrete example as a type, but this is only in order that there may be some definite point or centre on which to fix the attention. Even concrete examples as types are not always necessary, the pupils being quite capable of concentrating their attention on the simpler ideas when expressed in general terms, and whenever possible this should be done without resort to methods more suited to pupils in the lower and empiric stage.

The Progress to Symbols.

We may consider, then, that as the pupil advances into the region of definite conceptions he is becoming more and more prepared to think them in the abstract, and to use general terms in referring to them and to operations performed with them, and from this is but a step to the still more abstract symbolic forms. We have already shown that pupils of eight or nine can be led to express the working of problems in a general form, from which they can soon pass to formulating a rule by considering a general case and then expressing it symbolically. For example, in working out the rule for measuring Simple Interest:—

Interest for a number of years

$$= \frac{\text{rate}}{100} \text{ of Principal} \times \text{number of years.}$$

Symbolised, this becomes

$$I = \frac{r}{100} \text{ of } P \times n.$$

From this they can pass to such problems as—

If P be lent for n years at r °/$_{\circ}$ per annum, what is the interest?

If I be the interest on £P for n years, what is the interest on £P for 1 year, and on £100 for 1 year?

If I be the interest on £P at r °/$_{\circ}$, what is the interest on £100 for one year, and on £P for 1 year; and what is the number of years for £P to gain I?

If I be the interest for n years at r °/$_{\circ}$, what is the interest on £100 for n years, and what is the number of pounds that will produce I interest?

The problems to be worked should frequently refer to general quantities; for example: Find the cost of papering a room h yards high, b yards broad, l yards long at r/- per square yard; or in a yet more advanced form: State in symbolic terms a rule for finding the difference between the number of revolutions of two unequal bicycle wheels in going a certain distance. The latter problem should be worked as follows:—

Let R and r be the radii of the two wheels:

Then $2\pi R$ and $2\pi r$ will be the circumferences;

No. of Revolutions in going distance $D = \dfrac{D}{2\pi R}$ and $\dfrac{D}{2\pi r}$;

$$\text{Difference} = \frac{D}{2\pi r} - \frac{D}{2\pi R} = \frac{D}{2\pi}\left(\frac{1}{r} - \frac{1}{R}\right).$$

Every type of rule and problem can be treated in a similar way, and such exercises are a most convenient and

suitable stepping-stone to algebra. In the pupils' minds the symbols will stand for well understood quantities, and the operations performed will be grasped as relating these quantities in certain definite ways.

The Progress in Practical Measurement.

Though becoming more rational, more abstract, and more symbolic, the teaching should none the less aim at bringing the pupils into continually fuller touch with actual measuring. The practical work in this higher stage should be of a more exact and complex character than in the lower. Indirect measuring involving the use of formulae and calculation will take the place of direct measuring. The pupils will measure inaccessible distances such as height of a tree or house, regular and irregular areas and volumes, densities of various bodies by various methods, forces as applied in the lever, inclined plane, and pulley. Thus the arithmetic will be of a very broad character, bringing the pupil into more thorough and varied relations with the real world of things, from which he can learn something of their nature and so turn them to use.

This later stage of arithmetic, then, should witness a twofold advance—an advance in depth and rationality of treatment, and in complexity and extent of measurement. The former will begin by an analysis of the process of measuring to search out the relations between quantity, unit and number, and to establish the principles governing the notation of number, the expression of number in a fractional form, ratio, proportion, and percentages. These principles, when taught, will be applied to the measuring of various new kinds of quantities increasing in complexity of measurement, while the rules deduced for operating with them will be summarised in symbolic form for future use.

The Relation between Quantity, Number, and Unit.

15. The pupils, then, will begin with the relation between quantity, unit, and number. These notions spring out of a careful analysis of the act of measuring. It has already been seen that a whole is measured by being divided into a number of equal parts, and the evaluation is the number of times the whole contains one of the parts. In measuring a whole quantity there is a comparison of one quantity with another—the whole with the part—and the result of that comparison is number. Number is, then, the ratio between the whole measured and the unit of measurement and is obtained by dividing the whole by the unit, thus:— $N = \frac{Q}{U}$.

Thus a whole is measured by a fraction of itself and its quantity estimated by the number of such fractional parts. For example, to measure a field as 8 acres is to measure it by one-eighth of itself, and this relation can be expressed as follows: the field = 8 acres, or 1 acre = 1/8 of the field, or the field = 8/8 times the field. Thus a unit from the point of view of the whole is a fraction, and the number of such fractional parts in the whole is the ratio of the whole to the unit.

In measuring, however, it is usual to fix on certain quantities as standard units and to evaluate all quantities in terms of these. By having a common and familiar unit quantities can be more conveniently compared with each other by referring them to this unit, when the relation between the numbers will indicate the relation between the quantities.

For examples, if two quantities A and B be measured by reference to the common unit, one foot, as 12 ft. and 5 ft.; then the number of times A is contained in B

$$= \frac{A}{B} \text{ or } \frac{12 \text{ ft.}}{5 \text{ ft.}} \text{ or } \frac{12}{5},$$

$$\text{or } A \text{ is } \frac{12}{5} \text{ times } B,$$

$$\text{or } B \text{ is } \frac{5}{12} \text{ times } A.$$

To measure quantities by the same unit implies that the quantities are of the same kind. Two objects may be compared as to quantity in various ways—in length, weight, or value. The length of one, however, cannot be compared directly with the weight or value of the other, but only with its length. Moreover, these lengths cannot be brought into arithmetical relation unless they are measured by the same unit. For example, 4 yards can only be brought into ratio with 5 feet when both are expressed in yards or feet, as 12 feet and 5 feet. Then we can say one is 5/12 of the other, their sum is 17 feet, and their difference 7 feet.

From the notion of comparing quantities by reference to the same unit arises the Method of Unity. In comparing the cost of five with the cost of eight articles we can refer each to the cost of one as a standard unit. If then we know that the 5 articles cost £3 and wish to estimate the cost of 8 we can say: The cost of 8 = 8 times £3/5, which statement is all the pupils need to write in their books. The advance to proportion should be made later when fractions have been thoroughly considered. Then the statement will appear as—

The cost of 8 = $\frac{8}{5}$ times the cost of 5

" " = $\frac{8}{5} \times$ £3.

The pupils by that time will be able to understand that 8/5 of £3 is the same as 8 times £3/5.

This groundwork in the principles of measurement being laid and made familiar by practice, the pupils can advance

to the consideration of the notation of number and of fractions.

The Decimal Notation.

16. The deeper analysis of notation is connected with the teaching of Decimals. The pupils should by this time be quite at home with groupings of any kind, in fours, dozens, scores, and also with changing from one system of grouping to another. They have now to grasp thoroughly that the decimal notation standardises grouping in tens. Furthermore, they will be quite familiar with the idea of a fraction being a unit, and hence they will have no difficulty in grasping that a systematic notation must arrange for a progressive series of fractional units, a one being divided into ten parts giving tenths, and each tenth again into ten parts giving hundredths.

In operating with decimals several rules previously taught should be more fully examined and made clearer by reference to first principles. For example, only units of the same kind can be added or subtracted, from which it follows that ones must be placed under ones, tenths under tenths, and so on. The pupils will easily suggest that this is best secured by placing under one another the signs which indicate the point of transition from whole to fractional numbers. Again, a figure of a certain value when multiplied or divided by a ones figure gives a figure of the same value. Thus, 4 tenths $\times$ 3 $=$ 12 tenths. The pupils should be familiarised with this rule by working such examples as $76 \cdot 34 \times 4$ or $\div 3$, from which they should pass to grasping the principle of moving the decimal point when multiplying or dividing by ten or any multiple or power of ten, and to becoming familiar with it by practice. When this is thoroughly understood neither multiplication nor division by larger number will present much difficulty.

Several methods are advocated for multiplying and dividing decimals. Simplicity and uniformity should guide our choice. In multiplication it is simpler to keep all decimal points under each other, and more convenient for future work to begin multiplying with the figure of highest value. In division any system of moving the decimal point about is cumbrous. The numbers should be left as they are given, and the nature of the answer estimated by considering the values of the divisor and the dividend. In an example such as $97653{\cdot}84 \div 236{\cdot}9$ the divisor extends to tenths, and therefore until tenths are exhausted in the dividend the figures in the quotient will be whole numbers. The pupils in working the sum should think: 2369 tenths divides into 976538 tenths a whole number of times. When the 4 hundredths is reached the next figure in the quotient will be fractional and will be placed to the right of the decimal point.

The Metric System.

While the teaching of these operations is going on, the decimal notation should be applied to measuring lengths and weights in metres and grammes. The pupils should be practised in changing rapidly from one unit to another by moving the decimal point, and this operation is greatly aided by arranging the table in this form:—

Km.	Hm.	Dm.	m.	dm.	cm.	mm.
	1	8	3	5	6	

from which it can be grasped at once that 18356 cm. $= 183{\cdot}56$ m. $= 1{\cdot}8356$ Hm., and so on.

The metre-rule should be in constant use to measure doors, desks, windows, and walls, and for measuring smaller objects such as small cubes, cylinders, and cones the pupils should have rules divided into cm. and mm. on one side, and inches, twelfths, and sixteenths of an inch on the other.

Approximations.

This practical work will lead to the consideration of approximations. In the measuring of small and large bodies the pupils will soon discover that errors arise from a variety of causes, and the degree of accuracy which can be obtained in various cases should be noted. The personal equation in measuring can be shown by allowing all the pupils to make the same measurements, such as finding the relation of the circumference of a circle to the radius, when the discrepancy in their results will be obvious. All practical measurement will thus be seen to be only an approximation, and from this it is clear that no calculations from such measurements can attain a greater degree of accuracy. If, therefore, a length is measured accurately to centimetres it is absurd to calculate from this measurement in millimetres except for purposes of carrying. It is, therefore, necessary in dealing with practical calculations to teach the pupils the various methods of approximating.

Development of Numeration on Notation.

The comparison between the English and Frencn systems of units will serve to bring out the state of perfection to which the science of arithmetic has arrived. The examination of the metric system will have revealed that, with ten figures combined with the principle of place value, any number, large or small, whole or fractional, referring to any kind of quantity, can be readily and systematically expressed in the same notation. The superior facilities gained by extending the decimal system to all kinds of measurement, and the cumbrous nature of the English system of weights and measures, will be obvious.

It will be both interesting and instructive for the pupils to work out the development of numeration and notation

from its earliest beginnings, and the teacher should amply illustrate each stage by reference to the various arithmetical notations used in past ages and in other countries In this way they will begin to realise in some measure the time and thought expended in the gradual perfecting of arithmetical expression and calculation. They will see the science of arithmetic as a thing of life and growth, being wrought into greater and greater perfection by many hands in many countries through countless years. They will begin to appreciate something of the debt they owe, not only to their forefathers, but to such distant and alien races as the Hindu and Arab.

To trace the origin of numeration and notation the pupils should try to realise what it means to know nothing of numeration or of figures. They will see that our remote ancestors, having no system of numbering already invented for them, were driven to count by reference to some convenient standard always available. Such a counting instrument is provided by the hand with its ten fingers. With the hands objects will be counted in fives or in tens according as one or both hands are employed. Some races—as the Eskimo, the North American Indians, and the native races of Central and South America—chose five as their system of grouping. The Egyptians, Hindus, Greeks, and Romans chose ten. The advantage of the wider ten system will be obvious.

The pupils can now proceed to the development of the ten system. They should imagine themselves with only their ten fingers and a large number of objects to count. All will go well until they reach ten and begin to count another ten, then the need of marking off the number of tens will present itself. They will readily suggest that some symbol or mark should be taken to represent a group of ten. At first a small pebble can be used. As the pebbles begin to accumulate the necessity of counting these arises, and as

the fingers will not permit of counting beyond ten a larger pebble will be needed to represent ten groups of ten. And so the counting will go on. Here, then, was one of the origins of the decimal system.

Soon, names and then written signs would be invented as modes of communicating numbers from man to man more convenient than pebbles of various sizes. There would be a name for every number from one to nine, then for every group from ten to ninety and so on. This stage of counting can be illustrated by showing to the pupils many ancient systems of notation, such as the alphabetic system of the Greeks, the Roman numerals, the picture writing of the Egyptians. By attempting to work a multiplication or division sum with such a notation as the Roman they will soon begin to realise its unsuitability for calculation, and they will be interested in having illustrated to them the long and inconvenient method of reckoning by means of counters or the abacus.

Understanding the imperfections of these systems the pupils will readily suggest that the next great step in the growth of arithmetic was the invention of the system of place value. By this invention they will see that calculation without the use of counters or of abacus becomes possible. Here the teacher should impress on the pupils the debt we owe to the Hindu astronomers who first taught this system to the world, and to the Arabs who preserved and perfected its use during the long dark ages.

The development of fractions will be very instructive as throwing much light on the respective merits of the decimal and duodecimal systems. The pupils can readily suggest the advantages arising from varying the denominator systematically in descending powers of ten. The superiority of twelve to ten should, however, be pointed out; the much-used fractions $\frac{1}{6}$, $\frac{1}{4}$, $\frac{1}{3}$, and $\frac{1}{2}$ being readily

and conveniently expressed in twelfths, whilst $\frac{1}{3}$ and $\frac{1}{6}$ are only expressed in tenths by means of recurring decimals. The teacher should here show the duodecimal system of fractions used by the Romans, which lingers in the terms inch ($\frac{1}{12}$ of a foot) and ounce ($\frac{1}{12}$ of a pound Troy)—*uncia* being the Latin for a twelfth. A further heritage from the Romans is found in the familiar £. s. d., "said to be from Latin *libra*, a balance, a pound in weight; *solidus*, a coin of the value of twenty-five denarii, subsequently only half of that value; and *denarius*, a silver coin worth $8\frac{1}{2}$d. English."[1] The sexagesimal system of the Babylonians should also receive attention, as from them we borrowed our system of measuring angles and hours in divisions of sixty minutes and sixty seconds.

The origin of the many and various units for measuring length and weight will show to the pupils how naturally these units came into being, and how intimately they were connected with the daily life and work of our ancestors. They measured length with their fingers, their hand, their foot, and their outstretched arms, and so we get the finger's breadth, the span, the foot, and the fathom. The cubit was the length of the forearm; a furlong the usual length of a ploughed furrow; whilst the cable's length (120 fathoms) was the usual length of rope for anchoring a ship. The grain of wheat gave a measure for weight and the grain of barley for length, three barleycorns making one inch.

However interesting the pupils may find the account of the origin of these units, they will have little difficulty in realising their complexity and the confusion that follows from their simultaneous use. They will readily see that advancing civilisation demands that we should bring our-

[1] Stormonth's *English Dictionary*.

selves into line with other countries and adopt a system of units more methodical and more symmetrical.

Fractions.

17. After the decimal notation has been clearly grasped and familiarised fractions will provide occasion for the further study of the theory of measurement.

The early teaching of arithmetic should have made familiar to the pupils the notion of a fraction, for the idea is involved in all measuring. A whole is measured by being divided into equal parts and is thus a certain number of times each such part. This idea first receives conscious attention in considering multiplication and division, and the fractional form of expression should be taught in conjunction with these. By this means a working notion of a fraction will have been developed and the various operations with simple and convenient fractions will be quite possible, such operations for example as 1/5 of 25 ft., 4/5 of 25 ft., 9/10 ft. $\div$ 3, 4/5 ft. $\times$ 4, 5/12 ft. $\pm$ 3/12 ft. Moreover the fractional parts of a shilling, pound, foot, yard, and other common standard units will have been taught and will have formed the basis of working a considerable number of problems.

Rational Idea of Fractions.

In progressing to the more rational consideration of fractions the teacher should proceed from the point to which the pupils have already advanced. It would be a great mistake to begin here with dividing such an object as an apple or a square into equal parts. At this stage the pupils should be beyond this method of illustration and should be capable of appreciating rational inference from general principles. Starting with the idea of measuring a whole, say a wall measured as 12 yards, they should proceed by close analytic examination to work out in general terms the meaning of a fraction and the principles that govern

operations with fractions. They should grasp that the measurement may be expressed either as : the wall = 12 ft.; or, 1 yd. = 1/12 of the wall. The parts may then be numbered in terms of one such part, in which case 1/12 of the wall is the unit. It gives the name or label to the number, hence the term 'denominator,' while the number of such units is shown by the 'numerator.' It will be clear that the total number of parts, or 12/12 of the wall, will be the whole wall, from which the pupils can pass to the general statement that whatever parts a whole be divided into the total number of such parts makes up the whole. This statement should be symbolised in the expression—

A whole $= \frac{1}{1} = \frac{2}{2} = \frac{3}{3} = \frac{4}{4} = \ldots . \frac{n}{n}$. From this it is easy to proceed to the principle that as the number of parts increases so the value of the part proportionately decreases. It takes 4 eighths to equal 2 quarters or 1 half. This principle, examined by means of a foot-rule as a typical case, should be expressed finally in the form $a/b = na/nb$.

These main principles having been established and made familiar by the pupils applying them to a sufficiently large number of examples, the way is quite clear to proceed to elaborate from them the rules for operating with fractional quantities.

Addition and Subtraction of Fractions.

The method of adding and subtracting fractions is an immediate application of the principle that quantities cannot be brought into arithmetical relation unless they are measured by the same unit, scores cannot be added to dozens, nor thirds to quarters. The change to a common unit brings in the principle $a/b = na/nb$. It is quite unnecessary to illustrate by means of diagrams. The principles once grasped the application can follow by an appeal to

reason without taking the pupils back to elementary and empiric illustration.

Multiplication of Fractions.

By a similar general process the method of multiplying can be inferred from the meaning of multiplication applied to the meaning of a fraction. A fraction, say 3/5 ft., has two meanings, (*a*) 3 times 1/5 ft., and (*b*) 1/5 of 3 ft. The denominator thus indicates division of a whole, and the numerator multiplication of a part. Hence

$$3 \text{ times } \tfrac{7}{8} \text{ yds.} = 3 \text{ times } 7 \text{ times } \tfrac{1}{8} \text{ yd.} = \frac{3 \times 7}{8} \text{ yds.,}$$

$$\text{and } \tfrac{3}{5} \text{ of } \tfrac{7}{8} \text{ yds. will be 5 times less, } i.e. \ \frac{3 \times 7}{8 \times 5} \text{ yds.}$$

'Cancelling' can then be taken as a direct application of $a/b = na/nb$.

Division of Fractions.

In considering division its twofold meaning should be made clear. We may be asked to find either the number of parts when given their size, or the size of each part when given their number. The former view is the more convenient for dealing with division of fractional quantities. For example, 5/7 yd. ÷ 3/4 yd. means the number of times 3/4 yd. is contained in 5/7 yd. and the answer is the number that 3/4 must be multiplied by to make 5/7. Now, 1/4 must be multiplied by 4 to make 1 and 3/4 by three times less, *i.e.* by 4/3. Therefore, to make 5/7 the fraction 3/4 must be multiplied by 5/7 of 4/3. Hence 5/7 ÷ 3/4 = 5/7 of 4/3.

Generalised Forms.

The pupils should be taken through these proofs step by step and without hurry. At each important stage they should stop to work examples in order to become familiar with the new ideas and processes and to prepare the way for the steps to

come. Finally, they should proceed to symbolic expression, as for example—

$$\frac{a}{b} \pm \frac{c}{d} = \frac{ad \pm cb}{bd},$$

$$\frac{a}{b} \times \frac{c}{d} = \frac{a \times c}{b \times d} = \frac{ac}{bd},$$

$$\frac{a}{b} \div \frac{c}{d} = \frac{a}{b} \times \frac{d}{c} = \frac{ad}{bc}.$$

G.C.M. and L.C.M. should be taught just so far as they are essential to working with fractional quantities. Short and quick methods of working by factorisation should be adopted. The pupils should have plenty of drill in factorising and should know how to discover whether such simple numbers as 2, 3, 4, 5, 6, 8, 9, 10, and 12 are factors of a larger number.

Ratio, Proportion, and Equations.

18. After fractions have been considered the idea of ratio can be made fully explicit, and, in combination with the idea of proportion, can be used in the solution of problems. This idea of ratio—of one quantity being a number of times another—is not a new one. It was involved in multiplication and division and should have received more explicit examination in the treatment of fractions. We have already seen that two quantities to be compared must be of the same kind and measured in the same unit. So to compare say 4 yards and 5 feet they must be expressed as 12 feet and 5 feet, from which we can say that—

5 feet is 5/12 of 12 feet, and

12 feet is 12/5 of 5 feet, or

symbolically, a feet is a/b times b feet.

But we may consider an object in several aspects at the same time—for example, in volume, in weight, in value. In most cases these are in definite relations to each other. They vary together, so that if one is increased or decreased

a number of times the others are increased or decreased in a like ratio. If then we take two similar objects A and B, of volumes a and b, the number of times A's volume contains B's volume is the same as the number of times A's weight or value contains B's weight or value, which is more shortly expressed as

$$\frac{\text{A's volume}}{\text{B's volume}} = \frac{\text{A's weight}}{\text{B's weight}} = \frac{\text{A's value}}{\text{B's value}} = \frac{\text{a}}{\text{b}}.$$

This direct relation does not apply to all objects. The volume of a cube does not vary directly with the length of its side, but with that length cubed, and the area of a square with the side squared, while the length of time to complete a piece of work should vary inversely with the number of men employed.

The fractional form for ratio and the equational form for proportion, besides being the most convenient and workable, are by far the easiest to grasp. These forms express precisely what is meant by ratio and proportion. Ratio is the number of times one quantity is contained in another, hence it should be expressed so as to show that the one is divided by the other; that is, as a fraction. Proportion implies things varying equally, therefore an equational form is the most suitable.

The equational form of proportion suggests that here will be a most convenient place for beginning simple equations, in which the unknown quantity is represented by the symbol x. Thus in working the problem: Find the cost of 98 yards if 50 yards cost £7, we will let x represent the cost of 98 yards. Then

$$\frac{£x}{£7} = \frac{98}{50}$$

$$\therefore\ £x = \frac{98}{50} \times £7.$$

This method of working involves the teaching of cross

multiplication, but this should present no difficulties to the understanding.

Percentages.

19. Percentage is only a special form of fractions; it is a fraction; it standardises one form of division into parts. In calculating in percentage, a quantity is divided into 100 parts, and the unit of measurement is 1/100th part of the quantity, which by convention is written 1 %.

Frequently the simplest and shortest method of working percentage is to reduce at once to a fraction, as in the problem: I buy articles for £30 and sell at a gain of 5 %; find the selling price. The working will be

$$\text{S.P.} = \text{C.P.} + \frac{1}{20} \text{ of C.P.} = \frac{21}{20} \text{ of £30} = \text{£31 10s.}$$

The same method of reduction to fractional form applies to calculating interest. For example: Find the interest on a sum of money lent for a number of years at 5 %. The unit or rate of interest is 5/100 of the principal due every year. Hence

$$\text{Interest for one year} = \frac{5}{100} \text{ of the Principal.}$$

$$\therefore \text{ Interest for a No. of years}$$
$$= \frac{5}{100} \text{ of Principal} \times \text{No. of years};$$

Generalising the rate, this becomes

$$\text{Interest for a No. of years}$$
$$= \frac{\text{rate}}{100} \text{ of Prin.} \times \text{No. of years,}$$

and symbolising

$$\text{I} = \frac{\text{r}}{100} \text{ of P} \times \text{n.}$$

In compound interest it is most convenient to reduce the sum of money to a decimal and the rate to the most convenient fraction, while the results need not be worked

out further than three places of decimals, as ·001 of a pound is, roughly speaking, a farthing. For example: Find the compound interest on £745 12s. 6d. for 5 years at 4 %:

$$\left.\begin{aligned} P &= 745{\cdot}625 \\ I = \tfrac{1}{25} \text{ of } P &= 29{\cdot}825 \end{aligned}\right\} \text{1st year.}$$

$$\left.\begin{aligned} P &= 775{\cdot}45 \\ I = \tfrac{1}{25} \text{ of } P &= 31{\cdot}018 \end{aligned}\right\} \text{2nd year.}$$

$$806{\cdot}468$$

and so on.

General Character of the Teaching.

20. In presenting new subject-matter the teaching should progress in steps suited to the powers of the learners, and every step should be made thorough by working mentally a number of examples. In introducing new ideas and new processes the rate of progress should be that by which the pupils can attain the clearest grasp of new ideas, and can become familiarised with them before proceeding further. Too rapid an advance from one new thought to another will only result in confusion. For the same reason, the numbers used during this teaching should be such as to present no mechanical difficulties. All the attention can then be concentrated on grasping the new subject-matter. Following the teaching of new rules should be mental and blackboard work gradually increasing in complexity in order to familiarise the pupils with applying the rules in many and varied ways. When, by this means, they have gained a fair command of the new principle, they should advance to quite independent work at more difficult examples. These should be as varied in their nature as possible. Each example should give some fresh food for thought, and the pupils should honestly strive to work it for themselves. Independent work is essential. Only when an honest, keen endeavour

has ended in failure, should the teacher or another pupil show the way. By this means self-reliance, confidence, and power will be trained, qualities very necessary to all successful and effective life.

In working problems the pupils should be trained to grasp the method of solution as a whole, and not piece by piece in succession. In blackboard work the invariable rule should be to call on the pupils to state in general terms how the whole problem is to be solved. After a time, with careful and sympathetic criticism, they will become expert in doing this in a very precise and concise manner. Such general terms should then be written down symbolically as the first statement in the working of the sum. The written work of the pupils should be on similar lines, though care should be taken that, in applying symbolic expressions, they do not merely replace letters by figures without reflecting on the relations expressed by the formulae used.

In the independent written work of the pupils it is by no means necessary for all to be working the same sum at the same time. Bright pupils should be progressing quickly, duller pupils will advance more slowly, and the former will soon outpace the latter. A text-book containing collections of problems, varied and increasing in difficulty, should, therefore, be in use. Any sum attempted should, as a rule, be correctly solved before another is begun. Only so can the habit of care necessary for habitual accuracy be secured. At times, however, this may be varied, and interest added by the pupils competing to find who can correctly work the greatest number of examples in a given time. The blackboard should be judiciously used; and this, being interpreted, means that it should not be excessively used. At the beginning of a practice lesson difficult points may, with advantage, be explained on the

board, but during the independent practice the pupils should feel that they have to rely on themselves, and only in case of real failure should the teacher step in and use the blackboard for explanation. In their written work they should be trained to do their sums not only neatly but quickly, that is, as quickly as is consistent with accuracy. The first essential is accuracy, the second rapidity. We have already insisted that no calculation that can be worked mentally should be worked on paper.

Rapidity and accuracy can only be secured when the pupils have thoroughly memorised all essential tables, and can perform quite automatically all necessary mental calculations. What should be required of the pupils of the lower school in this respect has already been made clear. The older pupils have similar memorising to do with respect to their work. The equivalent decimal form for all the common fractions, and the fractional form of all common percentages, should be known by heart. Operations with decimals, fractions, and percentages should be made automatic by frequent practice in working mental problems of very varied kinds. Such 'drill' to secure the power of rapid, accurate, and automatic mental calculation should occupy the first five to fifteen minutes of every arithmetic lesson.

Practical Arithmetic in the Rational Stage.

21. By the end of the fifth year the pupils should be quite familiar with decimals and fractions, and should have a clear grasp of the principles of percentage, ratio, and proportion. The sixth and seventh years will then remain for a thorough application of these to various kinds of problems and to practical work, while, at the same time, the power of symbolic treatment should be considerably developed.

General Character.

It has been usual in primary schools to confine arithmetic almost entirely to calculation in money with a small sprinkling of mensuration. Such a course limits considerably the pupil's outlook on his material world. It brings him merely into contact with one aspect of life, the financial and commercial. Important as this is, it is not the only relation nor the broadest one that he should realise through what may be called his mathematical activities. The full command over the things comprising our material environment can only be gained by our having the power to foresee the means to be employed to change them from one condition to another more suited to our desires, and such change must be based on measurements of various kinds.

A full and broad course in arithmetic, then, which will exercise widely the activities by which the pupil obtains exact command over things, must include at least the measurement of space, of weight, of densities, and of force. Being largely practical in character, such a course will arouse keener interest in the pupils as having for them a direct bearing on real objective life. It will, besides, make clearer and fuller their ideas of measurement and will train habits of physical accuracy and care which will be invaluable in the future.

Measurement of Length.

We have already seen how the pupil in the lower school should be trained in practical measurement by making plans and drawing to scale. Such exercises receive a new direction when, in the upper school, he is taught the continental systems of measures. He will now measure in centimetres and in grammes. Passing from straight lengths to curved lines he will consider the relation between the radius and the circumference of a circle, by means of which he can

calculate the circumference of circular objects, as glass cylinders, lead piping, and copper wire. Longer distances should be dealt with in a neighbouring field or park. A pole or rood should be pegged out by means of a surveyor's chain, whilst at the same time the method of securing a straight line will be taught. By measuring round the field the pupil can form an idea of a mile in terms of the distance round, and this will become more real to him if he paces it out and calculates the number of paces to a mile. The time it takes to walk and to run round the field can then be noted, and the time required to walk or run a mile worked from them.

Measurement of Area.

The consideration of the distance round the field easily leads to dealing with the space enclosed, and it can readily be shown how distance round gives no true indication of area unless shape be taken into account. The pupil should now go indoors and work out the theory of measuring areas, in order that he may come back fully prepared for the practical task before him. The areas of rectangles, parallelograms, and triangles should not present much difficulty, though care must be taken not to fall into the error of saying that 'feet' multiplied by 'feet' give 'square feet.' If a rectangle be divided into square feet by a number of lines parallel to the sides, the number of feet in one side gives the number of rows, and the number of feet in the adjacent side the number of squares in a row. Hence

Area = No. of square feet in one row × No. of rows,

which is not a multiplying of feet by feet.

The immediate purpose of the practical work will be to find the area of walls, floors, windows, and other objects in and around the class-room, until familiarity with the triangle will permit the introduction of irregular figures,

when adjournment to the field will again be found necessary.

A square pole, square chain, and an acre should be pegged out with a number of flags, so that the pupil can see their relative sizes, and he can practise his knowledge in judging by the eye the number of acres and square chains in a field. After this he can set about measuring it by setting down base line and perpendiculars.

Measurement of Volume.

Questions of air space in the school will lead to the measurement of cubical contents, and as both practical work and problems will frequently involve cross sections the pupil must work out the area of a circle. The graduated cylinder will be brought into requisition in the measurement of liquids, and the graduation of such a measure will furnish a practical exercise involving careful manipulation and measurement and judicious calculation. The cylinder can then be used for measuring the capacity of bottles and the volumes of small irregular solids.

Measurement of Density.

The failure of this method in the case of bodies lighter than water leads to the treatment of density and of bodies that float or sink. The pupil should work out the various ways of finding relative density and apply them in practical work.

Measurement of Force.

The use of the balance and the consideration of gravity in connection with floating bodies opens the way to the treatment of forces in general and of gravity in particular. The pendulum, lever, inclined plane, pulley, and other mechanical devices in general use will provide plenty of material for both theoretical and practical work, while the representation of forces by lines will lead to the consideration of the parallelogram of forces.

Apparatus.

Such a varied course in applied arithmetic during the last three years of school life fits the pupil to cope with future life, both by the training in manipulative skill it gives and by the wider and more intelligent command over things it ensures. Neither a large amount of apparatus nor a special room is needed. Each pupil should possess a good rule divided into centimetres and millimetres on one edge, and into inches and tenths on the other, while the reverse side should show twelfths and sixteenths. For class work there should be a metre-rule, a surveyor's chain, a spring-balance, several balances for more careful work, and a set of pulleys. Much of the apparatus can be made by the pupils in the handicraft room. Each pupil can make himself a set of models on which to perform his measurements and, in addition, pendulums, levers, inclined planes, and all the apparatus for land surveying can be made in the school.

The Universal Nature of Geometry.

22. Geometry is the science of space. It concerns itself with "magnitude, its properties, conditions, and appurtenances." Space itself is universal, and space relations enter into all our dealings with material things. The movements we make are through space, and the adapting of material things to suit our needs and purposes is the altering of their shape and position by the use of force, which itself can only be defined in terms of space. Space, time, and matter are the fundamentals of all knowledge of the material world, and the science of geometry is the broad highway along which every physical science must plod to exactness and perfection, while every art from the rude efforts of the savage to the most wonderful of engineering feats consciously or unconsciously makes use of its principles and rules.

The History of the Development of Geometry.

23. Geometry, like every other science, had its beginnings in the efforts of man to fit himself and his circumstances more perfectly and exactly to his needs. Man subjects the world to his will by knowing it. Naturally, practice preceded theory. Early man, like the little child, did things before he knew the 'how' and the 'why' of them; yes, even before he was fully aware of what he was doing. He became conscious of this latter first, and thence came knowledge of a body of facts about form and position that helped him to make his tools and his hut, to plot out his land for cultivation, and to find his way over the plains and through the forests.

Geometry in Egypt—the Age of Empiricism.

In the ancient land of Egypt there were, however, problems of practical life that forced the knowledge of shape and position into great prominence. In this earliest of civilisations, some unknown number of centuries before the Christian era, the science of geometry was born and gained a name which "might carry with it a perpetual memory of the first and notablest benefit by that science to common people showed: which was, when bounds and meres of land and ground were lost and confounded, as in Egypt yearly with the overflowing of Nilus, the greatest and longest river in the world, . . . upon these and such like occasions, some by ignorance, some by negligence, some by fraud, and some by violence, did wrongfully limit, measure, encroach, or challenge, by pretence of just content and measure, those lands and grounds; and so great loss, disquietness, murder, and war did full oft ensue, till by God's mercy and man's industry the perfect science of lines, planes, and solids, like a divine justiciar, gave unto every man his own.

"The people then by this art pleasured, and greatly

relieved in their land's just measuring; and other philosophers writing rules for land-measuring; between them both thus confirmed the name of Geometry, that is, according to the very etymology of the word, Land-measuring."[1]

Nothing, however, was known but a body of facts and practical rules for realising practical ends. The extent of the knowledge of the Egyptians can be judged when we are told that its high water mark was reached when they discovered that if the sides of a triangle be 3, 4, and 5, the greatest angle is a right angle. This fact must have been of the utmost use to them in building their temples to face the desired point of the heavens and in determining the exact position and shape of their fields. A rule such as this the practical Egyptian mind accepted as a fact. Why the angle was right he knew not, nor, probably, did he care.

The Influence of the Greeks —the Age of Speculation.

From this empiric practical stage, which would have confined it to the narrowly utilitarian, geometry was rescued by the speculative Greek, who loved knowledge for its own sake apart from the goods of this world it brought in its train. He probed into its facts and rules, and in the hands of various masters geometry began to take a more scientific shape and form. For a sure foundation the Greeks framed abstract ideas of point, line, surface, of triangle, square, and circle, from which conclusions were reached by exact inference. Constantly new discoveries concerning the properties of figures were made, though the useful was not neglected, for we read of the height and volume of the pyramids being found and the distance of ships at sea measured.

[1] Quoted from John Dee, who wrote some years before the time of the Armada, by W. B. Frankland in *The Story of Euclid*, p. 17.

Gradually, "from being a miscellaneous collection of sporadic facts," geometry became a compact system of organised knowledge, in which from the simplest and most fundamental truths conclusions the most complex and abstruse were reached by a series of rigorous deductions. In such a form its study became for nearly two thousand years part of the famous Quadrivium—the four ways of higher education. Finally, in the third century before Christ, the immortal Euclid gave the final stroke of genius, and presented to the world and to future generations the perfect science in his *Elements of Geometry*.

In this form geometry has come down to modern times through many vicissitudes. Born on the muddy banks of the Nile, it grew to manhood under the care of the philosophic Greek; lost to Western Europe during the dark ages of ignorance and barbarism it, with all true culture, was preserved to the world by the science-loving Arabs and restored at last to modern thought at the Renaissance, when the pure love of knowledge woke to a new and freer life. The progress of its practical applications has been no less wonderful, and they are now as universal as space itself. Beginning with the surveying of land, geometry has extended its sway over the whole terrestrial and celestial universe. The humble joiner and mechanic seek its aid, and by its means the mighty fleets of the world have come into being and plough their way in safety over the pathless seas.

The Value of Geometry in Life.

24. Such, then, is the outline plan of its life history. Beginning in man's efforts to cope more and more exactly and effectively with his material environment, it became a body of known facts and practical rules. Speculation, probing to its utmost depth the 'how' and the 'why' of it, raised it to a perfect science, and utility and culture with

extended imagination bring the earth and sky under its rule and subdue all to man's will. In this history is indicated the heritage of science and art unfolded by a knowledge of geometry to the human mind which has mastered its principles. By its means we can pass with certainty beyond the reign of the senses to the utmost bounds of space. By its aid the solar system and the earth's surface are brought within human comprehension. Without it no science or art can be mastered. Its study is truly fundamental. So great is its importance in human life and human thought that we might with justice inscribe over the portals of our universities the warning engraved over the entrance to the Academy of Plato: "Let none ignorant of geometry enter here."

Growth of Geometrical Ideas in the Mind.

25. The growth of geometry in time is very closely paralleled by the growth of geometrical ideas in the human mind, a parallel much closer than exists in the case of other bodies of knowledge that have suffered great changes in their fundamental principles during the progress of time. The small child is impelled by instinct and necessity to master his physical environment, and he actively employs all his senses and members to test the things about him. By means of this unceasing activity of hands and brain he amasses many and varied crude experiences of position, direction, and shape that if not expressed in words at least find a practical outlet in a more or less appropriate action.

The Influence of Social Environment.

But the child is surrounded by a life of human thought and action, permeated by geometrical ideas and finding constant expression in speech. Born into this traditional and current life as well as into the physical world he begins to make it his own through imitation and speech, and the

crude actions and experiences of his instinctive life gradually take on the character and definiteness implied by the terms in current use. Thus, partly by watching others and partly on his own initiative, he discovers simple properties of solid and surface, line, square, and circle, and so acquires a body of empiric facts and rules for practical use in his childish occupations and in his intercourse with his elders.

The Influence of School Instruction.

With school life comes organising instruction, and the instinctive curiosity and practical activities of the child receive a definite direction through the systematic play of the kindergarten. The exercises with such things as cubes and sticks, and the drawing and modelling, give play to the natural instincts and direct them to the end of more definite knowledge, clearer language, and more skilled practice. In this way a working notion of the common geometrical ideas, a knowledge of the properties of the more common figures, and familiarity with the language of geometry become a conscious possession of the child.

A further impetus to this growth is, as we have seen, provided in the first years of the upper school by the making of plans and the drawing of objects to scale. From such exercises should spring many lessons giving the child further light on the nature of the square and circle, the right angle and parallel lines, for these and other forms will constantly be required in such occupations. Still further instruction must be given when drawing to scale advances to making plans, elevations, and isometric projections necessary for handicraft in wood in the later years of school life. But all his knowledge of position and shape arising out of such exercises has a practical bearing; it springs out of the necessities of his

measurings and his drawings, and leads back to them to make them more exact, intelligible, and easy. Such practical interests always loom large in the child's intellectual life.

When, however, the speculative instinct becomes an influence in the pupil's development some change should take place in the character of the teaching, a change analogous to that wrought by the Greek mind on the practical rules discovered by the Egyptians. The speculative instinct demands the reason for things; it substitutes logical necessity for practical convenience, and the keynote of the teaching will change from empiricism to rationality. Working notions and practical rules should now be probed to their bottom-most depths to find the why and the wherefore of their truth. Conclusions resting on experimental measurement and intuition will give place to strict logical demonstration. Ideas and operations will be analysed to their simplest and most elemental forms, and the practical conclusions of the earlier stage will be deduced from these by a train of strict logical argument. The practical, however, will not be superseded, for the pupils' nature is not utterly changing, but only developing to a higher intellectual life, where objective interests range over a wider field and are subjected to a deeper insight. The practical and the speculative now walk hand in hand, and as theory advances to its conclusions, these conclusions will be brought into relation with wider and more complex problems of terrestrial and celestial measurement.

Two stages, then, the Empiric and the Rational, will mark the progress of the teaching of geometry, not rigidly fenced off from each other, but merging the one into the other—a gradual crystallisation of perfect rationality.

Empiric Factor in the Teaching of Geometry.

26. The kindergarten sees the early beginnings of the empiric stage, and the time of plan and scale drawing will witness a slight advance on the same lines. But not till the end of the fourth year of the upper school will there be any really organised teaching of geometrical truths. The smatterings of early ideas should then be arranged and defined and receive considerable amplification by a definite course in constructive geometry. The pupils will thus become familiarised with most of the geometrical figures, terms, operations, and processes, and towards the end of the fifth year will be ready to take the step into the realm of speculation.

Character of the Teaching.

The dominant note of the empiric teaching will be its practical nature. Each main line of thought should spring out of some real problem of measurement or construction, and be pursued to such conclusions as will throw a more intelligent light on constructions and measurements of a wider nature. The most important principles of geometry will be considered in order to bind together groups of practical ideas which can be inferred from them. Such principles, however, will not be demonstrated to reason, but accepted on the test of measurement, or on such intuitions as symmetry and equality, which are ingrained in the pupils' habits of thought and action by the personal experience of their whole lives. Evidence of this kind will not be examined as to its logical character, but will be accepted as sufficient for the immature intelligence of pupils of this age.

Thus, in comparing lines and angles to discover the properties of various figures the pupils will make use of rule and compass, or, in many cases, the comparison can be more conveniently carried out by means of figures cut out in paper. Folding line on line, and angle on angle,

will then prove to the eye, although not to the reason, equality or inequality, and such measurement, backed by the intuition that it must be so in the nature of things, will be sufficiently convincing to pupils at this stage.

Nature of the Course.

There is no settled and incontestable way of beginning. A starting-point can be made of any one of a number of practical questions, each of which will by proper guidance lead to the same set of geometrical principles, and from these practical rules for construction can be deduced. The teacher is advised to draw up his own course and to modify it at will when the practical measurements we have already spoken of in the teaching of arithmetic open out opportunities for new developments. We will, therefore, content ourselves with sketching a few of the lines of thought the teacher might with advantage pursue.

First Illustration—the Circle.

A pair of compasses used for marking off distances will form a suitable beginning and will lead directly to the circle, one of the most important figures in practical geometry. The mere drawing of the circle with the compasses will demonstrate the fact of the radii being equal, and the use of the circle in measuring can easily be shown by asking the pupils to find three points three inches from each other, and a point two inches from each of two given points. Incidentally it can be noted that these illustrate the construction of equilateral and isosceles triangles.

Circles, however, are used not only in measuring lines, but also in dealing with angles, and this involves the principle that equal arcs of equal circles are opposite equal angles at the centre. The pupils can easily become convinced of this principle by superposing two equal circles and folding them to form two equal angles at the centres. From this experiment they can be led to understand that

the arc of a circle measures the angle at the centre, and that an angle may be viewed as the rotation of a line about one of its ends. These ideas should now be made familiar by many practical exercises involving the construction of angles and giving an opportunity of ascertaining experimentally that the sum of the interior angles of a triangle equals two right angles.

The measurement of angles suggests at once the consideration of a standard or unit angle. The right angle will be familiar to pupils of this age as a practical notion, but their conception of it needs defining and widening.

Two lines crossing each other at a point O so as to make all the angles at O equal will broaden the notion of the pupils as to the nature of a right angle, and this can further be illustrated by reference to the mariners' compass. They should grasp quite clearly that a complete turn round back to one's original direction is a turn through four right angles, and that to turn round so as exactly to reverse one's direction is a turn through two right angles, no matter what peregrinations or wanderings have been performed during the process. This performance, either in imagination or in reality, can now take place round the circumference of a circle and round the sides of a triangle, thus demonstrating in the first case that the circumference measures four right angles, and in the second that the three exterior angles of a triangle are together equal to four right angles.

From this latter conclusion it can easily be deduced that the sum of the three interior angles of a triangle is equal to two right angles. In a more direct manner this important principle could be verified by a pupil walking round the sides of a triangle and turning through the interior angles in succession, when he would arrive at his starting point facing in a direction the reverse of the original one, having

thus rotated through two right angles. The subdivision of a right angle into degrees could then be taken, with its application to the plotting out of the earth's surface by lines of latitude and longitude. The manner in which this line of thought can be developed has now, perhaps, been indicated sufficiently without our carrying it further into the consideration of the relation of radius to circumference, the construction and properties of the hexagon, equilateral triangles and angles of 60° and 30°.

Second Illustration—the Isosceles Triangle.

A second profitable line of thought is one bringing in the properties of the isosceles triangle—another important figure in both practical and theoretical geometry.

The construction of a rectilinear kite might form a suitable starting-point. In form the object consists of two isosceles triangles on the same base and on opposite sides of it, and the cross pieces joining opposite angles illustrate many important principles required in bisecting lines and in constructing lines at right angles to each other. A paper figure *ABCD* cut so as to represent two such isosceles triangles can be used to prove by measurement the truth of these principles. The paper should be folded carefully so that the point *C* falls exactly on the point *A* and then slowly smoothed down so that the crease formed exactly joins the points *B* and *D*. It will now be obvious that the two halves exactly coincide, that the crease *BD* bisects *AC* at right angles, and also divides the vertical angles *ABC* and *ADC* into equal parts. It can further be shown by folding that any point on *BD* is equidistant from the ends of the base *AC*.

From these facts the pupils can by simple and easy deductions work out for themselves the method of bisecting a line or an angle, of drawing a line at right angles to another either from a point within or without it, of finding

the centre of a circle, of describing a circle about a triangle, and of constructing figures in the production of which the isosceles triangle is an important factor. The properties of a square, too, can be discovered by conceiving it as two equal right-angled isosceles triangles on opposite sides of the same base.

Third Illustration—the Triangle

Another valuable series of problems concerning the determination of triangles, right angles, and lines arises out of land surveying. It soon becomes evident in measuring irregular areas that the triangle is the elementary figure to work with, complex figures being conceived as made up of a number of triangles, and the practical question, therefore, resolves itself into finding the position and size of these triangles. The line of thought thus proceeds to the determination of a triangle. Starting with one side, the pupils by experimental testing can discover that only two other measurements are necessary to complete the figure, these being either the two adjacent angles or the two sides. With these, only one triangle can be made. By starting at one corner instead of a side it can further be shown that two sides and the angle included by them will also determine a triangle.

In this experimental manner the pupils will arrive at the conclusions demonstrated in Euclid I. 4, I. 8, and I. 26. These principles can then be applied to considering jointed rods with respect to their rigidity. Rods jointed so as to form a triangle, or a figure composed of triangles, are theoretically rigid, and the pupils by comparing these with rods jointed to form a quadrilateral can suggest means for giving these latter a similar quality. This principle of rigidity can now be used to explain the structure of beams supporting a roof and of cross-bars for holding a gate.

The measurement of lines involves the operation of sighting, from which the fact that two points determine a straight line can be inferred and expressed in the definition that a straight line lies evenly between its extremities, or that it is the shortest distance between two points.

The number of such trains of thought is very large, and they can all arise out of the practical operations involved in woodwork, the drawing of plans, outlines, and isometric views to scale, and the surveying of field or playground. Here will be much more than sufficient to keep the pupils fully employed in the time given to geometry during the last three years of school life.

The Rational Factor in the Teaching of Geometry.

27. The pupils' knowledge of geometry is, then, constantly growing in extent, but it should also advance towards more organised rationality, and somewhere about the beginning of the sixth year a definite step can be made in this direction. It will be remembered that in the empiric stage the aim of the teacher was to convince the pupils of the truth of certain main principles, by measuring and comparing supported by an appeal to intuition. As the pupils' intelligence develops and their familiarity with the subject-matter increases, and as the speculative instinct becomes more prominent in their lives, this aim will change. Then, as we have seen, rigid demonstration must take the place of measurement and intuition.

The Nature of Proof.

The first step towards this is for the pupils to grasp the difference between conclusions based on measurement and those based on demonstrated proof. Unless this be done, they never realise fully and clearly why the test of the eyes is not as good as the test of reason. The nature of this new and perfect standard of truth should be unfolded to them and compared with the weaknesses of the old.

Though this is their first examination of the nature of proof it is not their first acquaintance with inference; conclusions have been inferred from principles, although those principles themselves have not been rigidly proved. In such exercises the teacher will have plenty of examples, both of conclusions founded on proof and of conclusions based on measurement, to illustrate his teaching. A number of such cases should be critically examined and compared, and the pupils should ask in each case: How do I know this to be true? They will discover that measurements are only approximate and only apply to instances measured; hence on the ground of a measurement it can never be truly affirmed: All these are so and so. The final weakness of measurement shows itself when the question is asked: Even if this is so and so, or even if all these are so and so, *why* are they so and so? In asking such a question the pupils will discover that it cannot be answered by measurement.

If now a proof be examined in a similar manner, the conclusion will be found to rest on other known facts; it will be seen to be true of necessity—it must be so—and furthermore that it is not only true of this case, but of all such cases. The note, then, that must dominate the new thought is logical necessity. The pupils must grasp that they are not now merely to be convinced that a thing is so and so, they must show that by the nature of things it *must* be so. A great logical difference exists between the mental attitudes of being convinced and of being able to show valid evidence for a belief, yet subjectively the former is often mistaken for the latter. Pupils of twelve years of age are quite convinced when they see one triangle exactly superposed on another that the one equals the other, and to proceed to the logical proof seems to them a work of supererogation. Moreover, as they grow older they become confirmed in habits of drawing conclusions from insufficient

data, unless their training is of such a character as to form more logical habits. It is one of the aims of teaching geometry to give such a training, and if preliminary analysis of proof and measurement brings home to the pupils the force of 'must,' and if when they seem inclined to be content with the evidence of the senses they are asked for proof of logical necessity, the new test of validity will take root in their minds, and habits of critical judgment will begin to be formed.

Most text-books of geometry begin with a list of definitions, postulates, and axioms, followed by the problems and theorems founded on them. For expounding the final perfected form of a science this order is excellent, but it is not the order in which knowledge develops either in the race or in the individual.

The Definitions.

It is clear from the historical sketch outlined above that strict definition only became possible after a long acquaintance with things, and arose only when accuracy in thought demanded a clear statement of meaning. Such also is the order of growth in the human mind. Logical definitions, then, should not be the first approach to the study of geometry. The pupils should have become familiar with the meaning of words by becoming familiar with the things they represent before the statement of meaning in its final perfection is demanded. Such familiarisation is secured by the practical work of the empiric and constructive stage. But when strict proof is demanded it must be based on definite meaning, and so the inferences in the rational stage of the teaching must follow from a clear statement of exact thought. To begin with the whole list of Euclid's definitions would, however, be an absurd proceeding. The consideration of isosceles triangles does not require definition of parallels, and that definition can wait until necessity demands it.

Each definition should be considered when its use becomes necessary.

The first to be taken on the pupils entering this stage of geometry are the exact meanings of the terms point, line, and surface. These ideas should result from an analysis by the pupils of their observations of the things around them. The idea of boundary, of separation of thing from thing should be clearly grasped. All material things occupy space, and each thing is separate from every other. Air is separate from water, yet they touch each other and the one bounds the other. The meeting place is a surface. Where two surfaces intersect is a line, and if an enclosed space be thought of in a surface we can think of a space within touching a space without, yet separated from it by a line. Similarly two lines intersect in a point, and any part of a line is separated from the remainder by points. The plan of representing point, line, and surface by means of paper, pencil, and chalk should then be criticised by the pupils and the adequacy or inadequacy of such means determined. As an illustration of the weakness of measurement the pupils should examine the difference between the definitions of such figures as isosceles triangles and square and these figures when drawn. It will be seen that all constructions are only approximations to a mathematical ideal, which is never fully realised.

Just as the pupils should grasp the force of valid proof, so they should be taught to understand the nature of a definition. In this way they will become conscious of a standard of clearness, precision, and conciseness in thought and language, and from this point strict accuracy in expression should be demanded from them and nothing less should be accepted. Pupils at first are not inclined to bother over the niceties of language. They will say a triangle is a plane figure having three sides and three

angles, without any sense of having transgressed the rules of definition, and it is only by their knowing something of these rules that some definite standard by which to criticise their expressions can be formed in their minds.

By examining the various properties of such a figure as a triangle they should be led to grasp that the objects of a class have many common properties, some of which are essential and some derived. To state the former is to imply the latter; hence the statement of the latter is redundant in the definition. Furthermore, to define a word is to state the essential properties in such a way as to limit that word to just one class of objects. By knowing this principle the pupils can appreciate some of the ambiguities that arise from statements of meaning of too loose and general a character. Though this task of working out the nature of a definition is fittingly begun by examining the meanings in geometry, where the relations involved can be most easily analysed, yet the knowledge once gained will prove an excellent weapon in exercises in literature and composition, when the meaning of words met with or used is under discussion. The pupils will in that way not only have a standard of exact and precise thought, but will be gaining the infinitely more valuable power of being critical in the use of words and in the interpretation of meaning.

Because the definition of a word states the properties every individual in a class must possess, and wanting any of which an object would be denied the class name, a definition is convertible. "An equilateral triangle has three equal sides" can also be expressed as "a triangle having three equal sides is equilateral," and both statements are implied in "None but an equilateral triangle has three equal sides." This convertibility of a statement does not apply to reasoned conclusions, and it is important that the pupil should grasp the difference in this respect

between definitions and such conclusions. In Euclid I. 5 an isosceles triangle is proved to have its base angles equal, but it does not follow from this that equality of base angles is not also a property of other triangles. This latter idea has to be tested, and is examined in I. 6, which completes the proof of "None but isosceles triangles have their base angles equal."

All people, whether young or old, frequently and easily fall into the fallacy of extending a statement to include its converse, and using the one or the other indiscriminately in an argument, greatly to their own satisfaction and to the discomfort of their opponent, who very probably is not in a condition of mental enlightenment to detect the flaw. Here again geometry can be made, by a wise teacher, an aid to exact thinking. The pupils should carefully examine the exact limitations of every conclusion at which they arrive, and explicitly state its converse, thus showing the direction in which thought must progress before a perfect convertible law can be proved.

The Axioms.

Just as a definition is the outcome of a gradual growth, so an axiom is the final stage in the evolution of proof. Men proved conclusions before they knew axioms, though they used them without being conscious of so doing. Indeed they made use of axioms in every action of their daily lives, and in this unconscious use lies the difficulty. Axioms are so much a part of our unconscious selves, so much woven into the web of habitual thought and action, that they elude analysis and cannot easily be made clear and distinct to consciousness. Man arrived at them by examining in the full light of his consciousness every step in his arguments to discover the nature of the evidence he had employed. He thus found that assumptions had been made, assumptions so simple that he could find nothing simpler, and which, conse-

quently, he could not prove by reference to anything else. He could not, however, reject such assumptions, for they were the basis of his whole fabric, which without them would crumble to the ground.

Such is their history and such should be their growth in the minds of the pupils. Axioms should not be taught before the proofs, but should be analysed out of the proofs after the assumptions have been made. When they are taught before the proofs the pupils rarely give them their proper place in the structure of geometric knowledge. When thus taught they seem so obvious that the pupil wonders why he has been called on to learn things so ridiculously easy, and therefore treats them with contempt because he does not fully understand their place in the science. To appreciate that place to the full, to grasp the axioms as the fundamental basis of proof, the pupils must reach them by an analysis of that proof.

Illustration of the Teaching of Axioms, Euclid I. 4.

In order to illustrate the teaching of axioms we will consider the teaching of one of the proofs and indicate the analysis which should follow. It will be interesting, perhaps, to take the case of Euclid I. 4, which the pupils should approach immediately after they have examined the nature of proof. This theorem, as we have already seen, arises out of the practical problem of drawing one triangle exactly like another. The teacher draws a triangle ABC on the blackboard and allows the pupils by starting at a given point E as apex to discover experimentally what must be known about ABC before they can draw a triangle DEF exactly similar in shape and size. It requires little practical insight for them to realise that only the lengths of BA and BC, together with the size of the angle ABC, need be known. Making ED and EF equal to BA and BC, and the angle DEF equal to the angle ABC, the teacher can

complete the triangle without the need of any further measurement.

When the pupils are asked to say how they can prove that the two triangles are equal, their replies will probably indicate that they still rely on measurement. In that case they should be reminded that mere measurement will not satisfy, that what is required of them is to prove that the triangles by their very nature must of necessity be equal. This, then, becomes the definite aim of the pupils, and the teacher can proceed to the proof, substituting for convenience two cardboard triangles for those on the blackboard.

The pupils will have no difficulty in proposing superposition as a test of equality. It is a method they continually use in daily life. To express the precise mode of superposition, however, is more difficult. The teacher can direct them to examine how they begin to superpose and how they progress with it so as to secure exact coincidence. The operation being thus analysed, expression should easily follow. The triangles will now be coincident and the pupils seeing this will think the whole matter ended.

Here again the teacher must protest against their self-satisfaction and remind them that seeing is not proving why the triangles from their very nature must be equal.

Then will follow the by no means difficult steps of proving A must coincide with D, BC must fall along EF and C must coincide with F, and the pupils will readily suggest the reasons for their conclusions. They will then in all probability immediately pass on to state that AC coincides with DF, and that, as all the parts of the triangles coincide, the triangles are proved equal. With this proof they will be quite satisfied. They understand it and have indeed suggested, with a certain amount of guidance, all the steps, though probably at this stage they do not appreciate

fully why so long a time has been spent over a thing that can be seen straight away. Even this they partly grasp and will in time do so more fully as, through familiarising practice, the nature of proof unfolds itself more clearly under their gaze.

The teacher however should be far from satisfied. The most important part of the work remains to be done. The proof has to be tested to see that every link in the chain of evidence is sound, and the teacher must so guide the pupils in this examination that the assumptions which they have made, and of which as yet they are not aware, will be brought to light. Where the conclusion rests on obvious data its soundness will be evident. The first difficulty will come when the pupils are asked the question: If A coincides with D and C with F how do you know that AE must of necessity fall on and coincide with DF? Every attempt of the pupils to solve this will come back to the fact that it could not fall anywhere else. They can understand that if it did fall anywhere else, so as to enclose a space, one or both lines would have to be bent, and can now state that two straight lines cannot enclose a space. The teacher should then ask how they know that; can they prove it? Vainly the pupils will endeavour to give some evidence for the statement. Every attempted solution simply assumes the point they have to prove, and they should receive a very practical lesson in having the fallacy of 'begging the question' exposed.

The teacher can now seize his opportunity to dilate on the incompleteness of the proof, on there being a weakness in the chain of evidence, until the pupils thoroughly realise that the validity of the whole structure rests on this simple and unexplainable link. The importance of this missing step will now loom large in their imagination, and the simplicity of the statement and their utter incapacity to

prove it will provoke great astonishment. At the proper moment the teacher should tell them that he too cannot prove it, and that up to the present no one has yet succeeded, as it is involved in the very meaning of 'straight line'; hence it must be assumed as true before we can proceed to accept a single proof.

In a similar manner all the axioms one by one should be discovered in the proofs gone through and should then be tabulated by the pupils for future reference. When so taught the real nature of these truths is apprehended. They are grasped as the foundation stone of every proof, and this because the emphasis has been placed, not on their utter obviousness, but on the position they hold in the whole argument.

Moreover, by approaching the axioms in this way, the pupils will receive a most valuable lesson in being critical of their own thought. They will realise that their thought has weaknesses previously unsuspected, and if such exercises be frequent a critical power will be formed that will tend to guard them from the danger of jumping too hastily to conclusions.

The Propositions.

The above example of a piece of teaching also illustrates the way in which the pupils should be encouraged to work through all the proofs. As they develop in power and experience, less and less guidance, suggestion, and critical help will be required, until a time arrives when they can do without help altogether. This can, indeed, be attempted from the first in the less complex proofs, and in all cases as little suggestion as possible should be given by the teacher. Teaching of this kind is undoubtedly slow at first, but gradually, as real power is acquired and self-confidence and initiative are gained, the work will progress as rapidly as the teacher can desire.

The number of propositions that can be gone through in the primary school is not large, and a selection will have to be made. These should deal with the most important properties of triangles, parallelograms, and circles. By this is not meant that the whole of Books I. and III. of Euclid's *Elements* should be laid under contribution. Only propositions of really fundamental interest and importance will be included in the course.

The theorems proved should be used to throw a more rational light on the geometrical ideas, rules, and constructions gained in the previous empiric work. These will now be proved to be applications of such general theorems.

The chief kinds of proof, such as superposition and indirect proof, should be examined. We have already observed that the former is a method of common every-day life, and this is also true of the latter. The pupils will appreciate this if they examine a simple illustration such as the following: If I know I have a certain key in one of two pockets and I discover it is not in one, then it must be in the other. From this they can state the general case: If A is either B or C and is not B, then it must be C: hence, if two things are proved equal, then they are not unequal, and if proved not unequal, then they are equal.

In memorising the conclusions arrived at the propositions should be grouped according to general similarities. Thus Euclid I. 5, I. 6, I. 18, and I. 19 can be summarised thus:

If in a triangle ABC

$$AB \text{ be } \substack{>\\=\\<}\ BC, \text{ then } \widehat{BCA}\ \substack{>\\=\\<}\ \widehat{BAC},$$

and the converses of these also are true.

Similarly I. 4, I. 8, I. 24, and I. 25 can be systematised as follows:

If ABC and DEF be two triangles having AB and CB respectively equal to DE and EF,

when $$\hat{ABC} \lesseqgtr \hat{DEF}, \text{ then } AC \lesseqgtr DF,$$

and the converses also are true.

The Spirit of the Teaching.

28. We have not attempted to plan out any specific course for the teacher, for he should be quite free to adapt both the practical and theoretical geometry he teaches to the life in the district in which the school is situated. It has simply been our endeavour to lay down the general principles which any course should embody if it is to be a real educative instrument for giving the mind and body an effective command over the physical environment, by means of clear thought, precise speech, and exact skill in measurement. In doing this we have purposely laid stress on the analysis of thought, which is an essential feature of the teaching of rational geometry if the pupils are really to understand it and esteem it of value. We do not, however, wish to minimise the importance of practical work, for throughout we have been governed by the idea that mind and body make up one organic whole, the body being the instrument through which the mind is brought to know the external world, and the power by which it executes its purposes in that world. Eyes and hands are the instruments of learning, and through eyes and hands the knowledge that results finds its realisation. But they are only the instruments. It is the mind that like a magician's wand turns things of clay into living and spiritual essence. To live this higher intellectual life in real search for truth, probing with keen judgment and calm resolution into one's opinions, is indeed an ideal that will not be reached in boyhood, but is nevertheless a goal towards which the youthful face should be turned.

The following books are recommended to the teacher :—

On the Teaching of Mathematics:

Smith : The Teaching of Elementary Mathematics	4/6	(The Macmillan Co.).
Young : The Teaching of Mathematics in the Higher Schools of Prussia	2/6	(Longmans).
McLellan and Dewey : The Psychology of Number...	6/-	(E. Arnold).
Branford : A Study of Mathematics and Mathematical Education ... (*in preparation*)		(Oxford Univ. Press).
Lodge : Easy Mathematics	4/6	(Macmillan).

On the History of Mathematics:

Cajori : A History of Elementary Mathematics	6/6	(The Macmillan Co.).
Frankland : The Story of Euclid ...	1/-	(Newnes).
Cunnington : The Story of Arithmetic	3/6	(Sonnenschein).

On the Subject-Matter of Mathematics:

Chrystal : Introduction to Algebra (Chaps. 1-6)...	5/-	(A. and C. Black).
Workman : The Tutorial Arithmetic...	4/6	(Clive).
French and Osborne : Graphs ...	-/6	(Clive).
Cracknell : Elementary Practical Mathematics	3/6	(Longmans).
Consterdine and Andrews : Practical Arithmetic	2/6	(Murray).
Consterdine and Barnes : Practical Mathematics	2/6	(Murray).
Rice and Clifford : A Heuristic Arithmetic	2/6	(Marshall).
Godfrey and Siddons : Elementary Geometry	3/6	(Cambridge Univ. Press).
Hamilton and Kettle : A First Geometry Book	2/-	(E. Arnold).

Workman and Cracknell: Geometry, Theoretical and Practical (Part I.)	2/6	(Clive).
Nesbitt: Inductive Geometry ...	1/6	(Sonnenschein).
Committee appointed by the Association for the Improvement of Geometry: The Elements of Plane Geometry	4/6	(Sonnenschein).
Fletcher: Geometry...	1/6	(E. Arnold).
Worthington: A First Course of Physical Laboratory Practice ...	4/6	(Longmans).

CHAPTER XIV.

THE TEACHING OF FORM.

Form as a Mode of Expressing Ideas.

1. AMONG the relations with the material world into which every individual must enter that of spatial form is one of the most universal. Everything we can see or feel has such form, and usually that form can be more or less modified by man's exertions when he wills such modification as a mode of adapting his material environment more perfectly to his requirements. Thus, the craftsman impresses on the material in which he works a form different from that it had before, and there is produced an object more or less perfectly embodying a human idea, and, as a consequence, more or less perfectly fitted to serve some human end. The end may be entirely one of use, as when a savage constructs a rude hut to shelter him from the weather. On the other hand, it may be essentially one of pleasure, as when an artist produces a beautiful picture or statue, whose reason for existence is that it gratifies the taste. Or it may combine both the useful and the pleasurable, as in a beautiful piece of architecture.

Whenever a man wishes to convey his ideas to another mind through the medium of sight or touch he does so by expressing them in some spatial form. For example, printing and writing are merely the impressing of certain conventional forms on suitable material. These conventional forms represent words, and the words thus suggested to the mind bring with them ideas of their meaning.

Now if the visible form of an absent object is described in words, it is evident that a very complex mental process has to be gone through before the hearer or reader forms a mental picture of that form, and that this process is at all points liable to error. But if, on the other hand, a direct representation of that form be given by drawing it or by moulding it in some plastic material, the interpretation is much easier and less liable to error. Hence, the expression of spatial form is most perfect when the form itself is reproduced.

Still more emphatically is this true when the form in question is ideal; that is, when it originates in the thought of some individual and has no existence in the material and visible world. How can a sculptor express his ideas except by making statues, or a painter without painting pictures? Obviously no words would ever serve to convey fully the artistic idea from the mind of the artist to the minds of other people. Without the artist's power to embody his ideas in visible and tangible form the world would have been infinitely the poorer. Indeed, we cannot imagine a world in which man was devoid of all power of shaping things to his own needs. One aspect of the advance in civilisation, indeed, is the continual development of this power and its wider and wider application.

The Apprehension of Form.

2. We have emphasised this human control over form, and the important part which modification of form plays in human activity, because unless this is clearly grasped the teaching of form will not be based on the right principles. For the most obvious thing about form is that it can be seen, and from this arises a tendency to try to teach form mainly through the sight.

Even without entering into a psychological analysis of the relation between sight on the one hand and touch and

movement on the other, a brief consideration of the fact that the visible form changes with every alteration of the spatial relation between the object and the eye of the observer is sufficient to prove that the typical form we derive from a series of visual impressions of an object is an abstraction. It is at most the form in one definite and particular position relative to the eye, and it is generally not even that. Indeed it can never be that in the case of a solid object, for we can never place object and eye in such relative positions that we can see all round it. We think of an orange, for example, as approximately spherical, but we never see more than half the globular form at once. But if we take the orange in our hands, and feel its shape, we get a much truer, because a more direct and complete, impression of its form than any amount of looking can give us. In the same way we attain a clearer and more correct estimation of the distance of place from place by walking from one to the other than by merely looking at the intervening country.

If, now, we take a body too large to hold in the hands, as, for instance, a building, we still find that impressions of form are given through movement as well as through sight. In looking at one side of a building we do not simply look, but we move the eye from point to point, following its lines. Often, indeed, we cannot see more than a part of the side we are examining at any one moment, and our total impression of the whole is a combination of many partial impressions made possible because they were obtained by certain series of movements of the eye which we have learnt to interpret as easily as we interpret the direct impressions of sight. But even this combination only gives us the impression of one side, or of a certain combination of two sides, in which we see each distorted from what we call the true shape. In order to get

similar impressions of the other sides we must walk round the building, and our apprehension of its plan is derived from a synthesis of the amount of leg movement required in passing along each face with the amount of eye movement in scanning each face from end to end.

We see, then, that clear impressions of form are only obtained when touch or movement is combined with sight. Do such impressions constitute a knowledge of form? We might as well ask whether the understanding of spoken or written language constitutes a knowledge of speech. Many people can read French or German with very fair facility who cannot express themselves in the language. Can such persons be said to know French or German? It may be said they have a one-sided knowledge, for they can receive ideas through the medium of the language though they have no power of using it to express their own ideas. But even this states the case too favourably, for expression and impression react upon each other and each helps to perfect the other, so that where there is no power of expression the power of impression itself is maimed and crippled.

Let us apply this to the knowledge of form, which is, as we have seen, analogous to speech as a mode of human expression. The young child himself shows us that to learn form is essentially an active process. Watch him represent his impressions in drawings, which examination shows to be essentially schematic expressions of his knowledge of the characteristic visible features of the objects represented. When a child draws a human face in profile and yet inserts two eyes, it is not because he is attempting to draw what he has seen or because he thinks a man has two eyes on one side of his face, but because he instinctively rebels against the limitations of visual impressions, and wants to express in one sketch all that his various visual impressions have taught him. Of course, we do not mean that the child

consciously goes through such a train of thought: we are analysing what goes on in his mind unconsciously to himself.

Watch him again when he examines a new toy; how he turns it about and looks at it from every point of view, and handles it in every way. But far from stopping there, if he can possibly pull it to pieces he will do so, and this not because he is a "troublesome, destructive little nuisance," as mother or nurse is apt to think, but because of his innate tendency to explore the shapes and makes of things by every means in his power.

It should be noted that this impulse to find out how things are made is an impulse to discover the form in which their parts are related to each other. We must go further. The normal child, if not checked, does not simply pull an object to pieces: he proceeds to reconstruct it, either in the original form, or in a new one. One of the most valuable features in Froebel's Kindergarten Gifts is the ease with which new forms can be constructed with them, just as one of their most serious defects is the restriction of the forms to geometrical figures.

The child's spontaneous modes of acting, then, show that he has an innate tendency to seek knowledge of form and to utilise his knowledge in the production of form. In this he reflects a long line of heredity. Mankind has been engaged in essentially the same processes from the very beginning, and, as we have said, without them mankind itself is inconceivable.

Need for Training in Form.

3. The child's life, then, will necessarily lead him to some apprehension of form and some power of producing form. If it did not, education in this direction would be impossible, for education can only train existing powers and direct existing modes of activity. In form, as in language, such systematic training is necessary if the child is ever to

develop into the adult he has it in him to become; in other words, if he is to be as useful in the world as he has the capacity to be. And such training to be effective must take hold of all the modes of activity by which form enters into human life. The end in view is that the pupil should attain a true knowledge of form, and really to know form is to be able to represent form in appropriate material, and that not by mere copying, but independently of everything except the idea of form in the mind. As well might we say that a person knows a language when he has no power of expressing his thoughts in that language as that he knows form when he can merely copy form.

Qualities inseparable from Form.

4. So far we have spoken simply of form. But form is by itself a mere abstraction which cannot exist alone, but must always be manifested in some material and marked by some colour. The colour we appreciate by sight, the texture of the material is made obvious by touch and pressure, but the real nature of the material can only be known when it is actually manipulated with the view of changing its form. Thus it becomes plain that a true teaching of form is a teaching it in its actual nature—as the form of some particular kind of material with some particular colour. This leads us back to the point we reached before, and strengthens the conclusion we there drew, that form can only be taught effectively when it is taught constructively, and when in teaching, as in life, impressions are valued just in so far as they facilitate the actualising of purposes and ideas.

Aesthetic Aspect of Form.

5. A further point must now be made. It has already been noted that form may be beautiful or devoid of beauty, and between these two extremes is an indefinitely large number of gradations. This is not the place to enter into a discussion of what constitutes beauty. Suffice it

now to say that under beauty of form we include all the elements of visual beauty—grace of outline, appropriateness of details, tone and harmony of colours.

Of all these qualities a child has an appreciation, but his appreciation is crude. He loves gaudy colours and strong contrasts, and his feeling for grace of form is even more embryonic than that for beauty of colour. But he delights in a beautiful flower, or butterfly, or bird, and, indeed, his expression of delight when he names such things 'pretty' is generally well deserved. He does not know why they please him: he only feels the gratification. But there is the germ from which an educated taste may spring. In a few souls it springs spontaneously and irresistibly: they are the great artists of the world. In the majority of souls it requires careful training, or it will develop but little, if at all—especially in a life passed amidst the generally grimy and ugly features of too many modern towns. It is not meant that the school should attempt to turn all its pupils into artists, but simply that it should aim at leading each to a higher level of taste, and thus should give an added value and interest to life.

Though few can become artists, all can become more or less appreciative of beauty, whether found in nature or in art. And though we may think the statement that "industry without art is brutality" somewhat extreme, yet we must grant that a feeling for beauty is a powerful auxiliary to more directly moral means of ennobling and purifying life. For we must hold with Plato that goodness, truth, and beauty are closely akin.

6. It is evident, then, that training in form, thus understood, brings the child into many true and valuable relations with the world, and that these relations

are typical of those by which man is gradually winning mastery over his material environment. They are relations into which each individual must enter in some way; the school training should aim at securing that he enters into them as effectively as possible.

General Functions of Training in Form.

But it is also clear that such training brings him into truer relations with his human environment. It helps him to understand and to evaluate rightly the forms of activity by which the community in which he lives maintains itself and bends the forces of nature to its purposes.

The great danger of the school is always that it may put itself out of relation to real life. Then it strives in vain to awaken its pupils' interest in its work, and consequently to evoke their hearty co-operation. And without this its real effect on their lives is but small. When he is trained to do things, the child sees at once a purpose in the doing, his interest and willing effort are called forth. One part of school work is seen by him to be a real help in his life, his interest in it is excited, and this interest predisposes him to find the more abstract and intellectual occupations of the school also worthy of effort to accomplish. And when the various modes of physical activity are related to these other and more distinctly mental modes of learning the interest becomes cumulative. That such correlation is possible and even easy throughout will be shown in the sequel.

Of the value of real mental culture there can be no doubt; of the evil of limiting school work to such culture there is also no doubt. On the necessity of making all acquired knowledge fruitful in some way we have already insisted. The world has always rightly held in but small esteem the mere pedant--the intellectual sponge

who for ever absorbs information, but never turns his accumulated stores to any purpose of value to mankind. That some men's lives should be devoted mainly to scholarship is good, provided that such scholarship is turned to account by increasing the knowledge and understanding of mankind. But the primary school may well take as an axiom that its function is to prepare its pupils to live an intelligent, practical life, and not a life mainly of thought and investigation. Those few of them who are fitted for such a life should find their way by the help of scholarships to higher schools.

Nor should the primary school be deterred by the cry of 'utility.' True utility should be its aim, as, indeed, it should be the aim of schools of every grade. Nothing is more false than the doctrine that the primary school should take utility as its purpose, while the secondary school should seek culture. The aim of each should be a cultured utility or a useful culture—it matters not which way it is put—though the exact form of the means through which that aim is sought will not be the same. What every school has to avoid is that narrow utility which trains the young definitely for one kind of practical occupation. That is really not a true training in doing at all, for by its narrow specialisation it limits the development of the power of doing and prevents it from being exercised in directions much more numerous than those in which it gives practice.

At no time more than in the present practical and industrial age has a purely bookish instruction in schools been out of relation to real life. And it cannot be too often insisted that when this is the case the school must largely fail to fulfil its true function in the community. To train in real purposeful physical doing is, then, an essential part of the work of every school which would fit

its pupils to enter into the real life of the world about them, both now and in the future. Moreover, if such training is sufficiently varied it often helps the pupil to discover the kind of occupation for which he is best adapted, and thus tends to minimise the likelihood of his entering on a walk in life for which he has little aptitude, and which, as a natural consequence, never calls out his best efforts, if even it does not become positively distasteful to him. It thus does something to minimise one of the most common forms of social waste.

The Development of Manipulative Skill.

7. The argument which has been developed leads, however, to the conclusion that training in various physical dexterities is an essential part of the education of every child quite irrespective of the grade of school he attends. For it has been shown that the relations with which such training deals are universal among mankind, and in some form and to some extent enter into every human life. They are functions without which life itself would be impossible. Consequently, the question whether they are well or ill performed cannot be indifferent to any individual, no matter what his station and occupation in life. And as every life-function has its inner as well as its outer aspect, the individual life itself must be mutilated if any essential form of functioning is neglected.

Perception and Skill.

Now one of the most fundamental and constant activities of life is perception, or apprehension of the various elements of our surroundings. In all such apprehension, form, with its inseparable correlates, material and colour, plays an important part, and we have seen that our knowledge of these qualities only becomes real and fruitful when we deal with them by physical activity, and do not simply contemplate them in calm mental isolation. Throughout life, and

especially in its earlier days, the essential question about any object is what we can do with it, and we learn its qualities as a means of answering that practical question. Increase of perceptual knowledge means, therefore, increase in power to modify things in various ways so as to adapt them to our purposes. And this continually increasing executive power we call manipulative skill.

It follows that perceptual knowledge and skill are inseparable—an increase in the one carries with it an increase in the other. In every practical activity we have a series of movements suggested and determined by the perception of the continually changing circumstances as the action advances towards the desired end. Skill simply means that all such movements are well adapted to secure the result. When skill is absent the movements are awkwardly performed, and the purpose is imperfectly attained. At first all series of movements are awkward, but with practice there comes a continually increasing adaptation, and the rapidity with which this is secured is much increased when the practice is guided by imitation of a good model of the activity. When skill has been attained the series of movements exhibits a large and important element of automatism. Attention is no longer given to the detailed execution of each successive step, but is kept fixed on the result to be attained and on the general adaptation of the means to its attainment. The series is willed as a whole, the kind of activity necessary is decided upon, and the actual carrying out of the movements is left to the established habits of motor adjustment. Every muscular contraction occurs just when and where it is seen to be needed.

Now, obviously, until skill is attained we cannot learn much about the possibilities of various materials in serving our purposes; we are too much taken up with ascertaining

the kind of qualities possessed by the material to be able to take the further step of fitting those qualities into our scheme of life. Thus, while skill is absent, perception remains in its earlier stages, and as skill grows it advances to a fuller and fuller apprehension of the meaning and values of things. For example, till skill in the working of marble is attained the would-be sculptor cannot realise the possibilities of marble as a vehicle for embodying artistic ideas. Similarly, only when the child has command over brush or pencil are the possibilities of beauty lying hidden in pigment or line made real to him. It is plain, then, that though physical activity and perception can be divided in thought they cannot be separated in practice without injury to both.

Physiological and Psychological Importance of Practical Activities.

This is brought home to us still more forcibly when we study the physiology of the brain. The points essential for our purpose are thus put by Sir James Crichton Browne:—

"The brain is not, as was at one time supposed, a single organ acting as a whole, but a congeries of organs capable of more or less independent action, and in its central region there is an area which is the fountain of all muscular movements, in which will, intention, or memory are involved, and the reservoir of all impressions derived from muscular movements. This motor . . . area of the brain . . . again is not a single organ acting as a whole, but is made up of a number of distinct centres presiding over groups of muscles, an excitation of which is followed by definite movements. . . .

"But motor centres in the brain, although capable in a way of spontaneous and independent action, do not, as a rule, act singly, but in combined and blended action with each other and with sensory centres, and in order that centre may thus co-operate with centre, pathways of

communication must be opened between them. . . . A brain that is to be serviceable must be used and well used, and what is true of a brain is true of all its parts, so every brain centre should be used and well used. If a brain centre is not used at all it undergoes degeneration; if it is imperfectly used it remains weak and sluggish; if it is excessively used it becomes irritable and unstable. And the just use of every brain centre necessarily implies the just use of the bodily organs with which it is connected. . . . It is impossible to establish communication between centre and centre unless the muscles subtending these centres are used. . . .

"But I must go further and maintain that use to be truly useful to brain centres must be resorted to at the proper time, and that exercise has an even more essential relation to the growth and development of the centres than to the maintenance of their healthy activity.

"The several centres of the brain do not expand and blossom all at once. They evolve gradually and in succession, and in every brain there are, at one and the same time, zones of budding spring, of luxuriant summer, and of autumnal harvest, opulent or meagre, as the case may be. . . . We know that each centre has its nascent or growth period, which is sometimes very short, as it must be in the centre in which the movements of sucking are co-ordinated, and sometimes very long, as in those in which are co-ordinated the movements of the hand from its first feeble grasp up to its consummate achievements in shaping and making. But whether the nascent period be long or short, it is of paramount importance that it should be taken advantage of while it lasts, and that the organs related to the centre should be duly exercised during its continuance. If the nascent period is permitted to slip past unimproved no subsequent labour or assiduity will compensate for the loss thus sustained. . . .

"The nascent period of the hand centres has not been accurately measured off, but it probably extends from the first year of life to the end of adolescence, its most active epoch being from the fourth to the fifteenth year, after which these centres, in the large majority of persons, become somewhat fixed and stubborn. Hence it can be understood that boys and girls whose hands have been altogether untrained up to the fifteenth year are practically incapable of high manual efficiency ever afterwards....

"The small muscles of the eye, ear, larynx, tongue, hand have much higher and more extensive intellectual relations than the large muscles of the trunk and limbs. If you would attain to the full intellectual stature of which you are capable, do not, I would say, neglect the physical education of the hand."[1]

These somewhat extended quotations from one of the greatest living authorities on the subject show that the connection we have urged between appropriate physical activity and increase of knowledge and intelligence is one made necessary by the nature of our physical organisation.

Social Importance of Developing Skill.

We see, then, that training in manual skill is an essential factor in bringing the young into true intellectual relations with both his physical and his social surroundings. But equally important is it in developing true moral relations towards life. When the work of a school is altogether bookish it tends to set before the pupils a false idea of the relative values of manual toil and other occupations. The idea that the aim of life is to be idle and that there is something degrading in working with the hands, that the clerk or shopkeeper is superior to the carpenter or blacksmith, that a black coat and silk hat are symbols of a

[1] *Presidential Address at the Salt Schools, Shipley*, pp. 24-33.

nobler and higher type of life than horny hands and garments soiled by toil, is one of the most mischievous that can take root in the mind of any individual. To lead to an appreciation of all honest work, to give the power of distinguishing good work from bad, to inspire respect for all worthy effort, to make clear that to produce something worth producing is man's noblest function in life, and that in the lowest as in the highest production it is the truth with which the work is done which ennobles the worker—these are lessons every school may well be proud to teach. In no way can such lessons be taught more vividly and more convincingly than in those manual crafts in which the very nature of the work done makes clear the deficiencies or the excellences of the workmanship.

Choice of Means for Training Skill.

8. Such considerations as those we have put forward establish beyond the possibility of cavil the importance of training manual dexterity in the production of form. It remains to consider what principles should guide the choice of occupations used by the school for that purpose.

Inherent Possibility of Development.

It is evident that an immense number of ways of employing the hands are possible. But mere employment of the hand is not what is wanted. Only those processes which lead on to fuller and fuller appreciation of form and the concurrent qualities of material and colour, and of the possibilities of applicability to human purposes, are of educational value. Hence, all exercises which simply train one narrow kind of manual dexterity, and which have no inherent principle of development into wider and more complex activities, should be rejected.

Several of the favourite devices of the schools—such as paper-mosaics—stand condemned by this principle. The dexterity this exercise gives can be as effectively attained

in other processes which are capable of development into higher forms, and which teach infinitely more of the form and nature of real things. Moreover, the crudity of colour in the only papers available renders paper-mosaic an actual training in bad taste. Infinitely better is it to fix the attention on the colours of flower and bird, of fish and butterfly; to train the eye to note the exquisite harmonies of shade in rock and lichen, of green leaf and blue sky, and to try to reproduce some of the simplest in the medium of water-colour, which, though it cannot rival the tints of nature, yet escapes the horrors of the coloured crudities which are produced in such large numbers in many schools.

Adaptation to Motor Development.

Other favourite manual occupations of the kindergarten and the lower school must be condemned because of their too great minuteness. Till the age of six or seven the co-ordination of the smaller muscles of eye and hand is very imperfect, and the exercises should be such as require wide sweeping arm movements and broad hand movements. From seven to about fourteen the power of accuracy in detailed movements increases rapidly; after the latter age there is some retardation of this increase relatively to that of the larger muscles of trunk, legs, and arms.

Value of Drawing and Modelling.

Many occupations are introduced into schools for the sake of variety. When this need is felt it is a clear proof that the right principles of choice have been departed from. No form of activity is worthy of special cultivation in school unless it is capable of development into higher and higher forms, a development, indeed, the full extent of which the school will never measure. Such exercises are drawing and modelling in clay or in some similar plastic material. The one is the germ of all great painting, the

other of all great sculpture. Fear need, therefore, never be felt that the pupils of a primary school will exhaust their possibilities. Moreover, in their more advanced forms they are activities which are felt to be worthy of the attention of an adult, and may thus be carried on in the leisure hours of later life by those who have a special artistic taste or aptitude. But who can imagine a sane man or woman employing a wet holiday in the production of paper-mosaics, and the other forms of perverted ingenuity of which that is the type?

Further, drawing and modelling when properly pursued fulfil the condition of uniting the physical activity with the mental activity involved in fuller and more exact knowledge of real things. Before one can reproduce from memory, either in clay or in pencil, the form of a flower, or fruit, or bird, or beast, or fish, or rock, or tree, one must have observed the object itself much more closely than one would otherwise have done, and that not merely by looking at it, but by bringing to bear on it every possible sense organ.

Nor is the range of drawing and modelling confined to natural objects. Man's productions are, as has been said, changes in the forms of natural things, and the changed forms can be studied and reproduced as easily as the original. Thus drawing and modelling are powerful aids to the apprehension of form, colour, and material wherever they are found. In other words, when properly employed they come to the aid of much of the school instruction in every subject, and their correlation with other subjects is continuous and infinitely varied in its mode. Whenever the teaching deals with a visible object it is possible to represent the form of that object by drawing or modelling, and whenever the object is important in the subject in which it occurs it is advisable to do so.

Carving in Wood.

In drawing and modelling, apprehension of form and appreciation of beauty are the chief ends aimed at, and the easily manipulated and yielding nature of the material offers little obstacle to formative effort. The case is different when wood is the medium of expression. Wood is indocile, and by working in it the pupil learns the desirable lesson that to carry out one's purposes one must adapt one's efforts to the nature of the means one has to employ. The carving in relief in wood of the simpler artistic forms drawn and modelled is, therefore, undoubtedly a valuable addition to the range of activities, and contributes materially to the acquirement of that perfect and automatic control of hand movements which is essential to the production of the best work. It is to be feared, however, that in comparatively few schools can carving be introduced at present owing to the dearth of qualified teachers. Its union with modelling and drawing from about the fourth school year is rather an ideal to be looked forward to than a present possibility.

Educative Handicraft.

Hitherto we have confined our attention to the study of natural and artistic forms. In many of man's constructions, however, beauty is made subordinate to utility. Drawing and modelling, therefore—and carving when it is included—need to be supplemented by a training in useful constructions with tools. Such handicraft should not be addressed to the acquirement of any special trade, but should be organised so as to give broad, but accurate, ideas of the general lines on which such constructions should be made, and of the uses and possibilities of the various common tools. Like drawing, modelling, and carving, such work in wood or metal is capable of indefinite extension. From the first rude attempts of a savage to construct a wooden seat to

the beautiful productions of Chippendale and Adam is a far cry, and fear need not be felt that the primary school will exhaust the possibilities.

Such work should, then, be introduced towards the end of the school life, and should receive much attention during the years of early adolescence, characterised as they are by the rapid growth and development of the larger muscles. Of course, handicraft is not so intimately related to the other subjects of the school course as are drawing and modelling, but it finds its appropriate place in the life activities of the child, and so is related in various more or less indirect ways to everything else which helps to constitute that life, whilst with some parts of mathematics and nature study its relations are very intimate.

Summary of General Principles of Method.

9. The general principles on which training in various forms of manual skill should be given have been indicated in the discussion just concluded. We may briefly summarise them: (*a*) The teaching should be such as to lead to clear and definite apprehension of form, and to power to express ideas of form in various materials. In order to secure this the mechanical and executive processes should be made automatic.

(*b*) Drawing, modelling—and carving when it is introduced—should be correlative to each other, the same forms being produced in each medium.

(*c*) The exercises should be related to the life experiences of the pupils, including the other subjects of school instruction.

(*d*) Educative handicraft should be general in its nature, and should be made a mode of studying part of the world of things as well as of gaining constructive skill.

Qualifications of the Teacher.

10. The fullest advantage can only be derived from handwork when it is taught by teachers who are specially qualified by skill and aptitude. Everybody can attain to some degree of manual skill, but not everybody has that natural artistic taste and culture and that special aptitude of hand which should be found in the teacher. Moreover, all branches of the teaching should be under the same direction, and, as far as possible, in the same hands. Such a broad treatment as is required cannot be expected when the teaching of handicraft is placed in the hands of a mere craftsman. Everything, then, points to the need in this branch of studies of following the example of France, and entrusting the art work of each school to a specially qualified member of the staff. So long as every class teacher is expected, as a matter of course, to teach drawing and some form of manual occupation, the work will fail to yield results commensurate with the time, effort, and money lavished upon it. And while this is the case it is to be feared that the general level of artistic taste in England will remain complacently tolerant of the ugly and appreciative of the meretricious.

General Nature of Course in Modelling and Drawing.

11. Having investigated the nature of form and the part it plays in human life, and deduced the general principles which should guide the teaching of form in schools, we will now briefly and broadly apply those principles to the subjects our analysis has led us to believe the most profitable. No attempt to lay down a syllabus will be made. In art work, more than in all other forms of training, rigidity is to be deprecated. Each competent teacher will draw out his own general course, and will provide within it abundant means for variation by individual pupils according to their powers and the quickness

or slowness with which those powers develop. Such general courses, and such possibilities of variation, will be effective in proportion to the skill with which the various elements of a complete training are related to each other. It is the general mode of such relations we have now to consider.

General Order of Study.

In the apprehension of the form of solid objects we have seen that touch and movement combine with sight, and that the impressions received from the latter must be interpreted by means of knowledge derived from the former. It follows that drawing is a more abstract and artificial way of representing solid forms than is modelling, and consequently that modelling should precede drawing in the earlier stages of teaching, and that, throughout, the two should illustrate and help each other.

Moreover, in the apprehension of surface coloured mass comes first: the exact shape of the outline is seized only when attention is specially drawn to it. It follows that mass drawing in colour should precede outline drawing. Further, as colour is so important an element of beauty, it is necessary that the representation of coloured masses should accompany modelling and outline drawing throughout the course.

General Contents of Course.

Bearing in mind the objects of the teaching of form we see that the contents of the course will be drawn both from nature and from art, and that the relations of these to each other, especially the ways in which the freer forms of nature are conventionalised so as to be adapted to the more symmetrical forms of art, are gradually made explicit. The artistic use of natural as well as of geometrical and conventionalised forms will be brought out by an examination of appropriate examples which makes clear the

principles of their construction, and the pupils will be led to apply those principles to constructions of their own, adapted to attain certain definite ends.

A well arranged course will harmonise with the order of the development of muscular co-ordination. Thus, the smaller pupils will mainly be engaged in free-arm drawing and the modelling of general mass. The representation of finer detail will only be required gradually as the co-ordination of the smaller muscles becomes more perfect. It will be recognised, moreover, that such perfection is attainable only on the basis of considerable automatism in the co-ordinations of the larger muscles, for without this there is no freedom of adaptation, and consequently no artistic quality. The course will, then, include continual drill in certain chosen basic forms which demand for their execution sweeping movements of arm or hand.

A course which thus harmonises with the physiological development of the child's life will also be in harmony with its mental development, for, as we have seen, perception and muscular co-ordination grow together. The mind apprehends wholes before details, and the more characteristic details are seized long before those less salient. The course of teaching should recognise this. In natural forms the gradation will be much less in the objects studied than in the thoroughness with which their individual divergencies from what may be called the typical form—say of a fish or of a bird—are seized and reproduced. The same natural objects may form appropriate exercises for the youngest and for the oldest pupils, but the amount seen and represented should be very different in the two cases. In art forms the basic lines of construction should be studied first, and the details gradually apprehended as growing out of such lines, and giving meaning to them.

General Method of Teaching.

Throughout an effective course it will be borne in mind that neither drawing nor modelling is mere copying. The object of each is to give a real and living knowledge of form, and such knowledge is attained only when the hand and eye working together can express the idea conceived in the mind. The general order of acquiring skill must be observed—imitation of example, reproduction by memory, origination based on such imitation and memory. The reproduction of forms from memory is involved in what has been said on the attainment of automatic skill. Without this all true and free origination is impossible. For in origination in art as in writing the attention must be concentrated on the ideas to be conveyed, and not distracted to the mechanical production of the forms by which the expression of those ideas is effected.

Further, the course will secure that in idea as well as in skill the same order is followed. Much waste of time now goes on in schools in what is ambitiously called 'design,' though it lacks the most essential feature of design—the adaptation to purpose. Such fancy drawing has no educational value, for it involves no element of training. It is from study and analysis of examples in relation to their purpose, from clear apprehension of the adaptation of means to end made intellectually automatic by much practice, that any power of real artistic origination springs. And the wise teacher will remember that he may have pupils who will be able to appreciate beauty of design, to discriminate degrees of worth in designs, and to reproduce beautiful designs from memory, who have little or no power of originating graceful forms and combinations. As has been said, all may learn to appreciate artistic beauty, but few have it in them to become artists. Too few teachers recognise that to encourage children to originate the ugly

is to give them a very bad training. 'Originality' is now-a-days so much in fashion that it is frequently forgotten that the evil and unworthy may be originated as easily as the good and worthy. It is the quality of the product, not its newness in human experience, which is the real test of its value in life, and consequently in education.

Art Work in English Primary Schools.

12. A course laid down on these lines will bear little resemblance to the kind of 'art work' frequently found in English schools. Paper-mosaics, 'free-hand' imitation of meaningless forms printed on paper, some drawing of geometrical models are the traditional constituents of such a course. To these is now frequently added more or less of the so-called 'designing' to which we have referred When we further remember that every teacher in a primary school is assumed to be capable of conducting such a course, whether he has or has not either artistic taste or manipulative skill, surprise cannot be felt that the results have been of little worth artistically or educationally.

In France these things are managed more wisely. There, drawing is only taught by teachers specially trained and qualified for the work, and 'free-hand copies' are unknown. The children draw from real things and so learn real form. Consequently they are interested throughout, and the results are seen not only in the actual excellence of the school work, but in the artistic superiority of the French workman over his English brother.

The traditional English course has aimed with single eye at manipulative dexterity, but has ignored the essential conditions of securing even that in a fruitful form. What knowledge of the actual world, what power of using it for one's own purposes, could possibly result from constant practice in the reproduction of printed forms which resemble nothing so much as the fantastic twistings of pieces of wire

apparently suffering from some horrible nightmare? Even when actual forms—as a vase or jug—were represented they were usually elevations, and thus actually impressed on the pupil's mind a form which he could never see, and so taught him—so far as it taught him anything—to see wrongly. What interest could possibly be developed by such teaching as this? How could it bear on life or on the needs of life?

The first reform in the teaching of drawing required in England is the absolute banishment of the free-hand copy, and no reason can be given for its retention except the incompetence of many teachers of drawing. In schools with a plurality of teachers this difficulty can easily be obviated by securing that at least one member of the staff is competent to carry on a course of art work, and then placing the whole of that work in his hands. And it must be emphasised that until this is done our art teaching in England will be generally unproductive and ineffective. It is no disgrace to a teacher to be unable to teach drawing and modelling: he may do excellent work in other subjects. But for a teacher who cannot draw or model to pretend to teach those arts is a wrong to the children, though a wrong which lies less at the door of the individual under whom the children suffer than at the door of those—education authorities or head teachers—who insist on his doing work for which he is unsuited.

When this is recognised another desirable result will be easily secured, at any rate in the larger schools. With the special teacher will come the special rooms. Instead of the monotony of one teacher and one room there will be the variety of some change both of teacher and of room. There will be the drawing-room, fitted with drawing surface all round the walls[1] on which the children can do free-arm

[1] Painted Parian cement makes an excellent surface.

drawings, with desks and seats specially adapted for drawing, and with casts and other objects from which drawings are to be made. And there will be the modelling-room with its tables and modelling boards, its modelling tools, and its objects for imitation. In each room will be examples of more advanced work than even the oldest pupils are capable of, yet not out of the range of their understanding and appreciation, which serve to whet their enthusiasm and to give them an ideal to strive towards. Lest such proposals should seem Utopian dreams it may be well to observe that in America they are dreams which are being more and more generally realised.

Early Course in Modelling and Drawing—First Steps in Modelling.

13. The combined course, then, will begin with modelling some simple object, such as a ball. Each child must have a ball and be encouraged to feel it with attention, so as to get the feel of it into his memory. Then under the teacher's direction he proceeds to mould the clay into a similar form and a similar size. From the ball to the orange is an easy step, and so on to plum, apple, pear, and other fruit forms. Each form should be practised sufficiently often to attain facility and the power of reproduction from memory. But though practising the same general form, as many varied embodiments of it as possible should be sought, lest monotony deaden interest.

At first the forms produced will be typical rather than representative of individual peculiarities, and they will be crude and imperfect, especially when executed from memory. The teacher, however, should at first aim at facility rather than accuracy, recognising that the latter is impossible without the former.

Very soon after modelling is begun, drawing in mass should be introduced. This is preferably done on the

wall surface, but if that is not available—as is unhappily the case in most English schools—brown paper may be used. Coloured chalks are preferable at this early stage to the brush as having a more easily managed point. Such mass drawing should begin in the centre of the representation of the object and work outwards, and the right colours should be used—yellow for orange, green for leaves, red for carrots. Of course, to ask the children to draw the outline first and then fill it in is not mass drawing at all, and fails in the object of leading the children to represent mass as they apprehend mass—that is, as mass and not as filled outline. At first, again, forms more or less typical will be produced, and in the earlier lessons it is better to have only one object for the children to look at, which should be fixed up in sight of the whole class. The teacher works on the board and the pupils imitate his method. This imitation of process should always precede the stage in which only the product is set before the pupils as a model to be copied.

Drawing in Mass.

In the representation of such forms the characteristic features should be emphasised from the first. Children are very quick to seize on such features, and it is their presence or absence which makes a representation life-like or the reverse. Such characteristic features are common to all members of a class of objects, and are, indeed, the marks by which we recognise the class to which any particular object belongs. The recognition of the peculiarities which separate individual from individual within a class is a gradual development of the same process by which the differentiating features of classes are noticed.

Apprehension of Differences.

Both perception and representation must proceed on these lines. Whether, in modelling or in drawing, the

characteristic features come first, the individual variations follow little by little. At first these, too, are better analysed out by the whole class from a common example, but as soon as possible each child should try to notice and to represent the peculiarities of a different object, the teacher using one specimen merely to lead the class as a whole to notice a certain kind of peculiarity, but impressing upon the children the necessity of noticing exactly how that peculiarity is shown in their own examples. Always must the teacher be on his guard against telling his pupils what to represent; the whole value of the exercise is lost if representation is not the expression of perception.

Brush Work and Outline Drawing.

14. The drawing in mass in coloured chalks will naturally develop about the third year into brush drawing in water-colour. Here an infinite vista of possibilities is opened to view; nature cannot be exhausted in the primary school. The intensive observation of colour which brush work entails if it is to be of worth is one of the surest means of training artistic taste. Flower and shell are specially rich in colour tints, but almost everything in nature can be turned to account. Of course the objects studied in the nature course will be represented in colour in the drawing course.

Side by side with the mass drawing in water-colour will go outline drawing with the pencil. Each helps and supplements the other; for while the former gives fulness and life to the latter, the latter by its insistence on details gives increased accuracy to the former. The full effect is only obtained when similar objects are drawn in both ways, but the tinting of pencil outlines has no value as a means of teaching form: it is a purely mechanical exercise for which the school has no time.

Course in Nature Drawing.

15. Of the arrangement of the course in nature drawing it is unnecessary to say much. As has already been said, it is not so much a difference in the objects represented as a difference in the perfection with which they are represented which marks progress. We will only remark that objects should be sought from all the departments of nature, especially natural life—fish and bird and beast, as well as plants and fruits, being laid under contribution.

In every case observation and practice should work hand in hand till the form can be produced with facility from memory, or even in an imagined position in which it has never been actually observed with close attention. It is, thus, quite needless to draw or model from stuffed examples of animals on the ground that the living creatures do not remain still. That practice is a remnant of the heresy that drawing or modelling is merely copying what is before the eye. The chicken in its constant movements remains the same chicken, and its very movements, by presenting to the eye its form in different aspects, enable the attentive observer to grasp the essentials of that form more thoroughly, and this is the essential preliminary to a life-like representation of it. No doubt at first such representations will be crude, even grotesque. That is the characteristic of all early attempts at art both in the race and in the individual, but it is the indispensable root without which the flower of artistic representation can never be secured.

When a natural object is either modelled or drawn it should be represented in a natural position. Thus, a pear should be lying on its side or hanging from a branch, not apparently upheld by a wire passed through its centre. This leads us to see that in modelling the object should not be

held and formed in the hands after the first few examples, in which it is looked at in detachment from its surroundings and in which only a rough approximation to form is aimed at. The model should be worked on a slab of clay which represents the board on which the actual object rests, and correctness in position as well as in shape should be sought. A good test of the degree to which this is secured is the more or less perfect coincidence of the direction and size of the shadows cast by object and modelled copy respectively. Such shadows should be studied in all drawing of objects as well as in all modelling of them. In this as in other respects the two modes of representation should go hand in hand.

Principles of Perspective.

16. In the representation of solid objects by a flat drawing there is involved an application of the principles of perspective. These should not, of course, be taught as abstract rules, but should be gathered by the pupils themselves from their own guided observations. The ordinary objects of nature and use do not bring out these principles so clearly and unambiguously as do certain prepared examples. It is, therefore, advisable to have lessons with such models, though at no time should they be made the main content of the course. They should rather be occasional incidents brought in by the teacher when the pupils have met with an executive difficulty which they will help to clear away.

In French schools children in the third school year are taught these principles with great success, and what is done in France may be done in England. A simple apparatus is found effective. "A frame of wire gauze or glass is used, on which to draw the models and show the perspective. Across this frame a small iron rod is placed on hooks to show the eye-level. A small circular piece of zinc, which is pierced with a hole, and slides on a vertical rod, is also used. This

fixes the point of sight. Any simple object is placed behind the wire gauze. The point of sight is placed on the table at the other side of the gauze. The rod, which represents the eye-level, is placed exactly at the same height as the point of sight, and each pupil who does not understand perspective is made to place his eye behind the point of sight so that he sees through the hole in the zinc. He then draws on the gauze or glass the object before his eyes. Then he draws the same object from another point of view and compares this drawing with the one he made first.

"The first model used is a square made of wire and divided into four equal parts by horizontal wires. It is drawn first from the front, then turned away. In both cases the eye-level is drawn across the paper, and when the square is drawn turned away the vanishing lines are carried out to their vanishing point on the line of the eye-level.

"The second model is the same square placed so that the lines are vertical."[1]

Then wire skeleton models of the simpler solid geometrical figures are studied. Thus the relations of the lines on which attention is to be concentrated are seen as far as possible standing by themselves, and the back lines are visible as well as those in front. The transition to solid models is easy. But it should never be forgotten that this grammar of drawing, and these examples specially designed to bring out that grammar, are merely auxiliary, and are uninteresting and uninspiring unless they are seen by the pupils to be helpful in drawing real objects. The transition to common objects and casts of various kinds of ornament should, therefore, be made as soon as possible.

[1] Moore, *Report on Method of Teaching Drawing and Design in the Schools of Paris*, pp. 4-5.

Course in Conventional Art.

17. This has led us to the course in the conventional forms of art. The foundations of this are found in certain more or less symmetrical forms. These should at first be drawn free-arm on the wall drawing-surface, or on small blackboards placed and held vertically. The course should begin immediately the children enter the senior school if it has not begun in the infant school. The drawings should be made without swaying the body, about the height of the chin, and of a moderate size, say six inches across. Afterwards similar free drawings should be practised on large pieces of brown paper laid on the desk, though drawings on vertical surfaces should never cease to be part of the course. In the upper classes the pupils should be able to execute with facility and accuracy drawings of considerable complexity and of any size the drawing surface will admit.

Throughout, the teacher must insist on free swinging movements, and no rubbing out should be allowed. Indeed, rubbing out should never be permitted in any of the earlier exercises in drawing. The children should from the beginning form the habit of putting down lines intended to remain. They will make mistakes, especially at first, but skill will come with practice. The swing of a curve may be practised in the air just above the paper or just in front of the board till the arm and hand are accustomed to it.

The drill in the basic construction lines of conventional art should be constant, but should never last more than ten minutes at a time, and should be made varied and fruitful by various combinations. The circle, the straight line, the ellipse, the spiral, the scroll, the crocket, and the anthemion —or figure consisting of a central lobe with other various shaped lobes symmetrically arranged on each side of it—

which plays so large a part in Greek art, should be practised till their execution becomes as automatic as writing.

Ambidexterity. Such figures should be drawn with both hands, separately and together, till they can be produced with facility and accuracy. This ambidextrous practice is a great help in the broader kinds of drawing, and the training of children in it has the advocacy of the great painter Meissonier. In modelling and wood work, of course, the power to use each hand is essential. In the finer kinds of drawing and in brush work it is better to keep to the right hand, for the anatomy of the brain shows that all the more delicate muscular movements have their centre in the left lobe of the brain, from which the motor nerves pass to the right side of the body. But in the execution of the larger movements it is customary to neglect the training of the left hand far too much.

Designs. These basic forms should not remain abstractions. They should continually be put to use. Their use in casts of ornaments should be examined: it should be seen how by combinations of one or more with various conventionalised natural forms designs suitable for certain purposes of ornamentation are built up, and having analysed such examples, the pupils should be encouraged to attempt designs of their own based on the same basic element and following the same general laws of combination. Such productions should be criticised from the point of view of their adherence to, or departure from, the accepted principles of constructive decorative art. The pupils should never be allowed to suppose that any fancy combination of curves or elements which in some way fills a given space is really a design, or has necessarily any worth. Of course, in judging children's attempts a high standard should not be taken, but throughout it must be made apparent that

artistic decorative art is governed by principles as definite as are the laws of harmony in music.

Further, it should be recognised that with some children time given to original design will be found by experience to be unprofitably spent. Such pupils will be better employed in studying and reproducing artistic designs of others than in degrading their taste by repeated perpetration of monstrosities of their own.

Modelling Art Forms.

Concurrently with this course in the drawing of conventional art forms should run a similar course in clay. For this, modelling tools will be needed. The pupil makes a plain slab or tile, and on it sketches with the edge of the tool the spiral, scroll or other element which is to be the basis of the finished pattern. This should be practised over and over again till it is satisfactory, the unsuccessful attempts being easily erased with the palette knife. On this ground plan the pattern is built up by adding clay, and is finished by manipulating it with the modelling tool.

Thus, copies of Greek architectural and other ornament can be both drawn and modelled, and the principles of decorative art learnt and applied. Vast variety is possible. The basic elements may be combined in an endless number of ways with each other and with suitable decorative additions. But this should never be done at random. The reason and fitness of each ornamental detail should be investigated, and in any original compositions attempted by the children they should be taught to imagine the general lines of the whole composition before they make the first stroke, not to go on adding piece to piece without an idea of what the whole result will be. Of course this does not imply that rough preliminary sketches to aid the imagination may not profitably be made.

Correlation with other Subjects of Study.

18. The power of drawing and modelling thus developed should enable the pupils in the upper classes to sketch rapidly and accurately the essential features of illustrations put before them in lessons in such subjects as history, geography, and natural history, and their note-books in those subjects should be illustrated by such sketches. The characteristics of a mediaeval castle, for example, are easily sketched; so are the forms of ships at different ages. A course of lessons on the development of church architecture might well be given to the elder pupils. The typical forms of arch and doorway and window-tracery are not hard either to distinguish or to draw, and the knowledge obtained and recorded in sketches gives added interest to many a walk either in country or in town.

Carving in Wood.

19. Of carving in wood we shall say very few words, because, as has been already granted, it can at present be introduced into very few schools owing to the small number of teachers competent to teach it. And in this subject, happily, teachers who know they are incompetent do not attempt to do the impossible, as they very frequently do in drawing and not infrequently in modelling. But when carving in wood can be taught it is an excellent adjunct to the other two forms of art work. It may be begun in the fourth or fifth school year, and requires but a small outlay for apparatus—a few chisels and gouges, a mallet, and one or two clamps being all that are needed for each pupil. The most profitable kind of exercise is the carving of panels in relief. Very similar designs to those already spoken of under drawing and modelling can be produced, though they would have less fine detail than the modelled tiles even as those would have less than the drawn designs. The pattern should be drawn on the wood with

chalk, which can easily be effaced, and repeated till it is satisfactory, and should then be marked over more permanently with a soft pencil. The wood not contained in the pattern is then cut away with the chisel till the pattern is left in relief.

Of course, the application of the art to the carving of boxes, and with more advanced pupils to the ornamentation of articles of furniture, such as chairs, stools, tables, cupboards, and desks, gives additional value and interest to the work in the eyes of the pupils.

Handicraft in Paper and Cardboard.

20. A well conceived scheme of educative handicraft should begin in the lowest class, and should be a development of the occupations of the infant school. In the first and second years articles should be constructed of paper, and in the third and fourth years of cardboard of varying thickness. Bags, envelopes, boxes, trays, and other suitable objects should be made; scissors and paste being used in the paper work, and the knife, steel ruler, and glue in the constructions in cardboard.

Mode of Teaching.

The general plan of teaching should be for the pupils to examine a typical object, and in the earlier lessons to take it to pieces in order to ascertain the shape of the paper or cardboard and the mode in which the parts are joined together.

Drawings.

In the elementary stages the children's drawings will usually be made on the actual piece of paper or cardboard which has to be cut, but later they should be encouraged to make rough sketches of parts or wholes of finished objects, to mark in pencil the measurements made, and from these records to produce an accurate drawing to measure. This drawing should then be used as a guide to the actual constructive work. In the later stages these plans of work to be done should be made

without analysing an actual object, the memory of former analyses giving the pupils power to imagine the construction.

By these means the children's advance may be a real growth in constructive power and not merely an increase in imitative ability. The pupil must apprehend clearly the result he desires to attain, and himself plan the means by which that result may be realised. In constructive handwork, more than in all other school exercises, the development of self-reliance and initiative is among the most valuable results which can be attained. In these subjects emphatically the best teacher is he who, to the greatest extent and in the shortest time, succeeds in becoming superfluous.

Handicraft in Wood.

21. Educative handicraft in wood, involving the use of tools, cannot profitably be begun before the fifth school year. It should then be studied intensively, at least one lesson of not less than two hours' duration being given to it each week, and when it is possible this time may, with advantage, be doubled; for in establishing muscular co-ordinations it is frequency rather than duration of practice which leads to the most speedy attainment of the desired result. Such handicraft is good for the pupil morally and mentally, while the physical benefits also are great. During a lesson in woodwork the pupil gets frequent short muscular exercises, and at the same time he is developing self-reliance, concentration of attention, perseverance, and appreciation of the value of accuracy.

Nature of Wood-work.

When educative wood-work is entered upon the same principles should guide the teaching as in constructions in paper and cardboard. But here new difficulties are met with. All woods are more difficult to manipulate than is paper or cardboard,

and woods differ from each other in their amenability to human efforts. Hence various kinds of tools have been invented, each of which is adapted to secure a certain kind of result.

The course should be so arranged that, as far as possible, only one difficulty, whether caused by material or by tools, shall be encountered at a time. The general result aimed at is not the ability to do certain kinds of joinery or carpentry, but to give the pupils as wide a command as the available time allows over their material environment, by training the power to transform it by handwork to their own ends. This involves, and, indeed, really means, that they gain an appreciation of the adaptability of different kinds of wood to certain purposes, and of the suitability of certain forms of tools to perform certain kinds of operations.

Correlation with Natural History.

In dealing with various kinds of wood reference should constantly be made to the knowledge acquired in the lessons on natural history, and when using any particular wood the pupil should associate with it the memory of the appearance of the living tree. The power to recognise various trees by their bark, twigs, leaves, and general appearance should now be supplemented by ability to distinguish various woods by the special texture of each. Thus the wood is not simply something to cut and saw and plane, but a piece of the real living world which man has learned to use for his own purposes.

But the direct question concerning the wood to be used for any constructive work is its appropriateness for just that kind of work. Is it of the right hardness or softness; will it splinter if fine work, such as carving, is wrought in it; will it take a polish, if a polish is wished for, and, if so, will polish and colour be just what is wanted? To some

of these questions an answer can be given after examining the wood in the light of the purpose, but the answer to the others must be sought through actual trial.

Principles of Gradation.

A scheme of work should show careful gradation in drawing, tools, and models constructed. Each must be progressive so that a new model involves new exercises in drawing and in the manipulation of tools. Each model should be complete in itself and not be a mere part in another, or simply an exercise, such as making a joint. Progression should be from easy to more difficult operations, from simpler to more complex productions.

Tools.

The first model should be made with as few tools as possible. The knife is the only single tool with which a model can be made from start to finish, and by using this tool in the construction of the earlier models the pupil learns much about the peculiarities of wood and notices the marked differences in structure between wood and the cardboard to which he has been accustomed.

The use of other tools should be introduced one at a time, though every new tool should, as far as possible, be used concurrently with those previously known. Each tool should be carefully examined, its construction noted, and the reason for that construction found in a consideration of the kind of operation it is intended to perform. Then the proper mode of holding and using it should be considered. Finally, the first crude attempts should be made to use it, and the pupils will realise how much easier it is to talk about doing a thing than actually to do it. No attempt should, however, be made to attain great proficiency with any one tool before using the next. As soon as a pupil can, with a fair amount of ease and accuracy, saw off a piece of wood from a board, the plane, with its many

different purposes, modes of using and results, should be introduced. The plane will take longer to master than does the saw, but as soon as a pupil has attained a fair degree of skill in its manipulation, he should begin to use the chisel.

Throughout the course the pupil should be called upon to exercise every new step in knowledge by judging what form of tool is best adapted to the work given him to do, which always, of course, should demand the use of no tools but those of which he has learnt the functions.

Skill.

In every part of the course carefulness of work and accuracy of finish are among the chief objects to be kept in view both by teacher and pupils. If pupils are allowed to form the habit of resting content with only a moderate degree of accuracy one of the most important educational results of the work will be missed. At the same time it must be remembered that finished accuracy is the result of skill, and, therefore, its degree should be expected to increase as the pupil's skill develops. To expect the same accuracy of finish from a beginner as may well be demanded towards the end of the course can only lead to disappointment of both teacher and taught, whilst much waste of time and deadening of interest by the over emphasis given to the purely mechanical aspect of the work will be an incidental result. The teacher should be satisfied, then, if throughout the course every piece of work is as accurate as the worker can make it. Careful measurements, use of eye and straight-edge to test whether the surface is level, and of touch to judge whether it is smooth, use of try-square to secure and to test right angles should all be continuous. No defect should be hidden by putty or covered up in any other way. The result should stand out in its bare and honest truth as just what it is—a closer or less close approximation to excellence.

Drawing and Planning.

Handicraft, however, is not only executive skill. Its essential foundation is in the planning of what is to be done. Such planning might conceivably be performed entirely mentally. But in practice the mental conception is put upon paper, and in teaching such a process is essential, as it is the only way in which the teacher can know whether the final construction embodies the original plan, or whether the plan is adapted to its purpose.

As in all other branches of originative work, the process is one of simple imitation at first and of adapted imitation later. The pupil begins, then, by examining a finished object, and that this examination may be as thorough and effective as possible, it is well to have at first dissected models which he can actually take to pieces and put together again. He then makes careful drawings of it to scale. His drawings at first should be of front elevation and plan. At later stages side elevations and sections, and oblique or conventional isometric views should be made. After completing the drawing the pupil should proceed to make his model from it, and should be required to make his measurements on the wood as accurate as those on the paper.

After considerable practice he attains a kind of generic memory of the more common forms of plans and constructions, and he is able to adapt the remembered elements to designing a new construction adapted to meet a certain need. Thus he gains the power to design a model when only its uses are explained to him, as, for example, if he is required to fashion a box constructed to hold nails and screws in separate compartments, or a hanging bracket on which a lamp may be placed. He has then reached the fully constructive stage in which he both plans and executes, the drawings made in orthographic, oblique or

isometric projection being the intermediary between his idea as conceived in thought and his idea as actualised in wood.

Models.

In this, as in other forms of training skill, there is no need for us to draw out a detailed syllabus. Every competent teacher will prefer to plan his own. Moreover, a slavish copy of other schemes would not be following out the principle of initiative which should be one of the objects of teaching and which should characterise the teacher or it will never mark the taught. No other material lends itself to such a variety of form and to such a variety of tool exercises as wood.

In making his list of models, the teacher should take care that the articles are such as can be made entirely by the pupils, that they can be used by the pupil either for himself or in his home, and that they shall tend to develop in him an idea of good shape. Such a list would, perhaps, include such models as:—Penholder, seed-marker, rulers (round and flat), plant-pot sticks, finger plate, letter opener, paper knife; and models in which the commoner modes of fastening and jointing would be incorporated, such as holders for keys, button-hooks, matches, watches, etc., money-box, pen and inkstand, letter-rack, knife-box, box for shoe brushes, etc., etc.

The work is most interesting in itself, as it leads to the production of a visible object which did not exist before. But obviously both its interest and its value in leading the pupil into relations with the actual world are increased if the objects made are things of real use. A course which consists simply of joints and other elements of construction but which never embodies those elements in real things fails to attain the purpose for which it should be taught.

It may be helpful, however, to illustrate the principles

we have laid down by a brief consideration of two of the exercises which might appropriately find a place in the course. In preparing his scheme of work, the teacher of handicraft would 'analyse' each model, in order to see that it came in its proper order in the series, arranged in complexity and difficulty of tool exercises.

The first model would probably be made entirely with the knife, and, in the scheme, the analysis would be something like the following:—

Model I.—Round handle for paint-brush.

Wood.—Birch or yellow pine.

Dimensions when finished.—4″ × ¼″.

Tool used.—Knife.

Exercises.—*Long-cut* in cutting to square, octagonal, and round form; *Cross-cut* in making ends 'square' and in cutting to length.

Object.—Training of senses of touch and sight—of accuracy and perseverance—of muscles of fingers and hand.

Having made careful dimensioned drawings, the pupils would be supplied with pieces of wood, previously cut to approximate size by the teacher, and suitable in all respects as to straightness of grain, hardness, etc. They would then make an attempt to cut one side of the wood perfectly level, using eyes, fingers, and straight-edge to test for accuracy.

Having succeeded in making a good surface, probably cutting up several pieces of wood in their attempts, the pupils would cut an adjacent side level, making it at right angles with the first—or 'face'—side. When the face-side and edge are cut at right angles, the wood should be cut to width, and then to thickness.

The model—which now would be a square prism—should next be cut octagonal, then round, cut to length

and finally finished off with a small piece of glass-paper. It should not be lost sight of that the pupil is probably making his first attempt at cutting wood accurately with a knife, that his previous experience has been in cutting cardboard, and that he has many new difficulties to encounter.

Some of these he tries to overcome by the liberal use of glasspaper. This should not be allowed, but accuracy of cutting must be insisted upon. For one model successfully made with glasspaper there are more than fifty spoilt.

When the pupil came to the construction of, say, a small stand for a plant-vase, which would necessarily be placed far on in the series of models, the method of procedure would be different. After securing from his teacher a few particulars as to dimensions, etc., the pupil should make a sketch of an original design for a plant-vase stand.

When he has sketched one to his teacher's satisfaction, accurate dimensioned drawings should be made before proceeding to the construction.

The teacher's analysis might be:—

Model.—Stand for plant-vase.

Wood.—Basswood.

Dimensions.—Height 1′ 6″, thickness $\frac{3}{8}$″, width of top $9\frac{1}{2}$″.

New Tools.—Mortice, chisel and mallet.

New Exercises.—Mortice and tenon; long sawing with rip-saw, and wave sawing with bow-saw.

Object.—Training of eye (beauty of form)—originality of design—self-reliance—muscles of arms and chest.

Woodwork in Rural Schools.

In rural districts, where the number of pupils in a school is not large, it is not usually found expedient to provide as expensive an equipment as is possible in town schools. The circumstances of each case should be considered, but the

object in view is the same, whether the teaching is given in town or in country—the learning by doing and the active employment of the child's powers in securing some material result of interest to him. A modified course of instruction, in which the objects made have special fitness for the district, would include such things as seed-markers, plant-sticks, dibbles, shafts for hammers and axes, milking stools, handles for spades. The tools required for such a course are neither numerous nor costly, and in many districts the timber would be at hand.

Handicraft in Metal.

22. When a pupil has received instruction in woodwork during two or three years, a year's course in metal work will benefit him greatly. The course should proceed by careful gradation from wire-work and soldering to working in sheet metal and forging. It would include such models as wire puzzles, bent iron brackets, coat suspenders, meat hooks, angle irons, nuts and bolts, hinges, staple and hasp, and other simply formed objects in common use.

The Teacher of Handicraft.

23. In conclusion, we would repeat that the object of introducing handicraft in wood or metal into schools is an educational one, and that its value depends on the teacher. A mere mechanic with no grasp of educational principles will render the course of little or no educative value. It is not the production of objects by rule of thumb that is wanted but the development of certain qualities in the pupil by bringing him into certain effective relations with his surroundings. And for this purpose a real teacher is needed. Of course he must understand woodwork, but he must also understand education and teaching, and his grasp of the latter should be sufficiently profound to take up into itself his knowledge of the former.

24. Although not directly concerned with the apprehension and construction of form, yet, as one of the most valuable modes of handicraft for rural schools, school gardening may here receive a brief mention. In school gardening the pupils learn to perform in an intelligent manner a class of operations which play a large part in country life, and which may be made both profoundly interesting and of great physical benefit. The high educational value of the cultivation of a garden and the close and intimate connection that can be established between such work and natural history is shown by the success which has attended this form of instruction in Sweden, Switzerland, Austria, and Germany, and in a few cases in England.

School Gardens.

The practical instruction would be given chiefly in the spring and autumn. The work during spring would embrace the preparation of the ground, planting of fruit trees, vegetable growing and flower culture.

During autumn there would be the necessary attention to the fruit trees and bushes—binding young trees, propping them, and noting the diseases to which the trees, fruit, or leaves are subject—the gathering of seeds and the taking up and potting of plants which must pass the winter under shelter.

In conclusion we will repeat that the essential thing to secure, whether in town or country, is that handwork, whatever be its form, should always be both headwork and heartwork as well. The teacher who secures this may well rest content.

The following books are recommended to the teacher :—

Liberty Tadd: New Methods in Education	8/6	(Low, Marston & Co.).
(A full and suggestive treatment of the whole subject.)		
Unwin: A Manual of Clay Modelling ...	3/-	(Longmans).
(Deals practically with the modelling of natural forms.)		
Holland: Clay Modelling...	3/6	(Ginn).
(Deals practically with conventional art forms on tiles.)		
Morris: Complete Drawing Course. Part I.	4/6	(Longmans).
Moore and Clarke: Report on Methods of Teaching Drawing and Designs in Paris Schools	3d.	(Southwood, Smith & Co.).
Board of Education: Suggestions, pp. 65-9	8d.	(Wyman).
Rich: Paper Sloyd...	3/6	(Ginn).
Hodson: Educational Sloyd	2/6	(Philip & Son).
Educational Sloyd, by an Inspector of Schools	4/6	(Philip & Son).
Holman: Hand and Eye Training ...	1/-	(Clarkson & Griffiths, Manchester).
Wright: School and Garden	9d.	(Cassell).

CHAPTER XV.

THE TEACHING OF NEEDLEWORK.[1]

Purpose of Teaching Needlework.

1. The aim of the teacher of needlework should be to develop in the pupils the power of coping with the actual needs of life in the matter of dress. Therefore the methods and processes taught in the school must be such as are applicable in the home life, and the pupils must know when and how to apply them. This knowledge demands that the girl shall have acquired a considerable degree of manual skill during the school training. She must also have learned to exercise her practical judgment, and to act upon her own initiative. The needlework teaching must therefore follow those lines which will give fullest scope for the development of these powers.

Training in Skill.

2. In the first place, the manual skill desired is that which can be applied in the stress of a busy home life. We will consider briefly the conception of skill which is involved in each of the three leading branches of school needlework. These branches are—

(*a*) the stitches employed in garments;
(*b*) the cutting out and making of garments;
(*c*) the repair of garments, household linen, etc.

[1] By E. L. Melville, M.A.

Kinds of Skill Necessary.

In the case of the stitches the teacher should be satisfied with quick regular working, such as causes no undue strain upon the eyes. Counting threads is a reprehensible practice, though fine and more delicate work may be introduced into the syllabus for the older pupils, for motor memory has then reduced the difficulty of fine workmanship. Ornamental stitches may be included with advantage because the girls take pleasure in them and they develop good taste and a responsive touch.

The need for the attainment of skill in cutting out and making garments is still greater, since sewing machines have now so largely replaced hand sewing. Too frequently teachers have planned, cut out, and tacked all the garments made by the children, who thus are quite unaccustomed to the use of scissors, and the handling of material. The pupils should, whenever possible, both cut out and put together the garments chosen for the year, as well as carry out the sewing of them. Then clumsy manipulation will gradually give place to dexterity and confidence. One plan adopted by a head teacher known to the writer is that of allowing the classes after the third year to cut out and fix for the younger children when necessary.

Thirdly, skill in the repairing of garments can only be attained by giving the children opportunities of dealing with actual worn garments, where they will meet with real difficulties.

Means of Training Skill.

One method often advocated as a means of training manual dexterity is that of providing mechanical aids, as, for example, dotted calico. To teach the button-hole in this way is surely in direct opposition to true educational principles. Children in the fourth year ought to be able to dispense with any such help. So too, the use of diagonals

in placing a patch is a mere temporary aid which cannot be applied in the case of real garments. The use of rulers in making tucks and pleats is also undesirable. Dexterity can only be trained by allowing hand and eye to assist one another without the intervention of devices which must later be discontinued.

The teacher's chief instrument in directing the movements of the pupils is frequent demonstration on enlarged specimens. This enlarged apparatus should, as nearly as possible, be of the same material as the children's specimens. Complete sets of such apparatus are in use in many schools. Teachers will be wise in choosing for demonstration purposes material which does not confuse by a multiplicity of holes. Often a larger piece of the material given to the children is most effective. Large needles and very coarse cotton are obtainable, and thus the whole process can quite easily be shown to a class. To pin up the apparatus on the blackboard is convenient as regards its actual manipulation, which must be done skilfully and readily if it is to produce the desired results in the class. Demonstration frames would be much more useful than they often are, if they contained a larger area. In any case, by subdividing large classes, teachers will greatly add to the value of the demonstration, which must be clearly seen by each child.

A very important addition to this demonstration is the use of good diagrams. Stages in a process can be represented by a drawing, whereas the needle and sewing cotton cannot be left in the exact position which demands care on the children's part. As a rule the teacher should make the diagram after she has demonstrated the difficulty, so that the children clearly see its reference. The drawing should be bold, large, and simple, the stitches few and very much enlarged. Coloured chalks are very helpful here.

Sometimes a more elaborate diagram requires preparation beforehand, as, for example, diagrams illustrating the position of the needles in knitting, or of the thumb and stroking needle for gathering. These will amply repay the teacher for the trouble taken in preparing them. Individual mistakes can be corrected by the pupils themselves with such drawings confronting them, and the amount of individual teaching and repeated demonstration is thus minimised. Sometimes the children may reproduce in a diagram a point just demonstrated, and in this way revise it. Finally, instruction should be given in those minor details of working which tend so much to produce clean, smart results. The ways of placing fixing pins and threads, the least cumbersome modes of holding work, the neatest starting points, are cases in point. Thus the children may profit by the experience of others.

Training of Practical Judgment and Initiative.

3. Practical judgment, self-reliance and initiative, can only be trained by allowing the children to make stitches and to work exercises which are really required in garments, and to apply these to garments. They should be introduced to the various stitches and exercises as the garments to be taught require them, so that they realise the practical value of their work. Again, children should not merely cut out garments from dimensions and shapes given to them by the teacher. The pattern to be taught should be studied in its relation to actual figures, and to the purpose of the garment. Thus the children will understand what regulates the shaping and construction of garments. Their sense of proportion will be trained, and they will depend not merely upon their memory but upon their power of reasoning.

The principle of all constructive lessons is involved here, namely, that the pupil should first form a clear idea

of the result wanted, if necessary by actually handling some completed instance of it, and then proceed to obtain that result. Practical judgment can only be really developed by allowing the child plenty of opportunity for relying upon her own power of devising methods. It is not enough that she should recognise the suitability of those proposed by other people. Children will not always have patterns at hand, or older people to give advice. When placed in new circumstances they must be able to act on their own suggestions. Therefore, the mode of teaching should gradually progress until in the end the pupils are as largely as possible independent of definite instruction. This general advance may be briefly discussed at this point.

Progressive Nature of the Mode of Teaching.

The form of teaching in the earliest years must necessarily be largely demonstration and instruction in the process of construction given by the teacher, and accompanied by imitation by the children with criticism and encouragement on the part of the teacher. But even such simple exercises as the fixing of hems and seams, and the stitches required for them, offer much scope for the training of initiative. Little children can determine why a raw edge is inadmissible, and can suggest how to get rid of it. Although to suggest the hemming stitch would be beyond them, they can easily be led to reason about its suitability to the purpose. A little time given to the training of this inquiring habit of mind will amply repay the teacher later. Thus even in these early stages the children can at times suggest both result and process, though often both are beyond them.

There is, however, the intermediate stage in which the children, by examination of a finished example, can arrive at the process of obtaining it. The teacher's function is then to demonstrate the details of the plan suggested by the

class. This examination may involve the unpicking and close handling of the example. For this purpose the teacher must supply each child with a specimen already prepared by another class, or have ready an enlarged specimen for this analysis. The children's synthesis will, in many cases follow in its entirety after the teacher's demonstration. This is preferable since it demands self-reliance, and retention of the steps of a whole process. In other cases, after the children have reached a broad idea of the plan of working, the teacher may find it advisable to let their activity and her demonstration advance together, step by step. The difficulty of detail, and the retentive powers of the class will determine this. The herring-bone stitch usually needs the latter procedure; the simple darn may be taught in either way according to the class. The two stages of the gusset, shaping and inserting, can be taken according to the former plan.

In the higher classes the teaching should demand the inventing not only of the process, but also of the result. The three stages, direct imitation, invention of process, invention of result and process, must, nevertheless, largely overlap throughout the course. Thus it would be unfair to expect even the girls of the sixth year to suggest a gusset without having previously examined one.

(*a*) In this highest form of teaching the teacher must first give a definite purpose to the children, such as making a night dress front opening, repairing a worn vest or a pinafore torn near the corner, or drafting an overall yoke pattern.

(*b*) By the help of previous knowledge the pupils should next picture mentally the requisite result. The teacher should act here as guide until the children have formed an established habit of thus definitely deciding upon a suitable result. Before any attempt is made to produce the

proposed article it is always well to give definite expression to its essential characteristics by means of a drawing or plan. The teacher will find that such preparatory drawings compel the pupils to analyse and define their conceptions of the end in view, and thus the conception becomes explicitly apprehended. Unless this is done the efforts of the girls tend to become mere guesses, but when once the idea of the end in view has been really defined the difficulty of discovering a process by which to attain that end is much diminished.

(*c*) The girls may next determine the process by which the desired result can be attained, the teacher herself giving as few hints as are compatible with her desire to prevent futile suggestions.

Nature of the Necessary Exercises.

Thus in the repairing of the torn corner of an apron, the method of print patching and the principle of all patching being known, the children should first try to apply these ideas here. They may suggest the cutting away of the corner, and the replacing of it by a patch with hems prepared. They should next try to apply such a suggestion until finally they see the advantage of having continuous hems. At this stage they should represent by a drawing the appearance of the right and wrong sides. They will then see the advisability of first unpicking the hems on the garment and of placing the patch in position before cutting away the corner itself. Finally the hems will once more be turned down.

This habit of foreseeing difficulties and modifying plans to meet them is the all-important quality needed. Exercises requiring the undoing of a seam or band in repairing will involve very little further trouble on the teacher's part if taken up after the above instance. The choice of exercises is the leading factor here in the training of real judgment.

Let them be in relation to real life, the mending of actual garments and household goods, the making of real garments or parts of them. In some schools a dressmaker is now appointed whose duties include this instruction in the repairing of garments.

Value of Self-teaching.

Finally, occasional opportunities should be given to the pupils of working entirely without guidance when the teacher knows them to possess the necessary skill and knowledge. They should be left to their own resources in this case, while the teacher merely checks guessing. The individual methods will then be criticised, advantages and disadvantages discussed, and the best method finally adopted for further practice work. A class which has repaired a vest worn under the arm could thus be left to repair a bodice similarly worn, whilst a class which fully understands the principle of construction in the case of the overall yoke could reasonably be expected to draft a yoke pattern for the night dress without further assistance. No better preparation for actual life can be afforded than this self-teaching, which tests so effectively the power of the pupil to apply the skill and knowledge gained.

Of equal importance with the foregoing is the training of the elder girls in calculating, and, when possible, purchasing, the amounts of material necessary for the various garments. The relative value of such material and its suitability for certain purposes as determined by its cost and durability are eminently practical considerations which should have presented themselves to every qualified needlewoman. Still another branch of knowledge of great service in a girl's training is concerned with the well-known plans for economising material when two or more garments are cut at the same time, as in the case of the sleeves of night dresses or shirts, or the gored side-breadths

of petticoats. On all these matters careful notes should be made by the pupils, and these should be of lasting use to them in later life.

The Teaching of the Chief Stitches and their Application.

4. The early part of the school course in needlework is concerned mainly with giving a fundamental knowledge of the simpler stitches necessary in making garments. Instruction in hemming, seaming, and knitting comprises the main portion of the work during the first three years, and to these running might be added with advantage. The younger children cannot, of course, cut out the articles of wearing apparel to which they apply these stitches, but the elder girls may be allowed to do this, and to fix those portions which present too great difficulty.

Hemming.

Hemming is generally begun in the infants' school and further practised in the first year of the upper school. The comparative smallness of the stitch and the executive skill demanded justify the teacher in allowing the use of dotted calico by the children at first. Although the folding of the hem is usually taken after the stitch has been learned, there seems little reason why it should not be taught first if the teacher permits the earlier exercises to be done on lined paper and dotted calico. It affords a good opportunity for suggestive co-operation by the children, who will easily explain the steps of the folding—for example, the first fold and the second a little deeper—whilst the tacking thread is decidedly easier than the hemming stitch. The order of teaching the exercise cannot follow that in which it is afterwards worked.

First, the stitch should be examined by the children so that they grasp its use. When they understand how it is intended to catch a small part of both fold and garment, the teacher should demonstrate its construction. In addition to her enlarged apparatus, which presents some

difficulty in showing how the work should be held, a good diagram previously prepared, illustrating the position of the fingers and the relative places of the needle and the left thumb, should be kept before the class throughout the lesson. The dotted calico to which reference has already been made is advantageous for this practice because its coarse yet soft texture permits of a larger and freer stitch. Its use should, however, be discontinued as soon as possible.

Secondly, the commencement would be taught, and this demands a knowledge of the stitch. The general ideas as to the requirements of a good start, neatness and strength, will first be made clear, after which the teacher will demonstrate the method, if possible getting some proposals from the class. The new position of the needle should be compared with its ordinary position, and both emphasised on simple diagrams.

The method of finishing and the making of the join would follow next. The latter introduces the new idea of the desirability of continuity of stitch. When the teacher has shown the children how to place the broken end of cotton as that it lies between the fold and the garment, they should be required to apply their knowledge of the start and to complete the join. The careful teacher will especially emphasise by demonstration and diagrams the points in which children generally fail, the distance of the new stitch from the last one, the holding of the two short ends firmly, and the method of enclosing them by the new stitches. These ends must not be pushed up under the fold and then disregarded—an easy but insecure arrangement.

The articles to which the stitch can be applied should be introduced as soon as the children have attained a certain degree of regularity of working. Handkerchiefs, soft

dusters, mats, doll's apparel, can all be fixed and sewn by the children. Large goods, and those made of stiff material are to be avoided. Glass cloths should be freed from their dressing before children are required to hem them.

Seaming and Running.

The next exercises are concerned with the joining of two pieces of material. The folding and stitches involved occupy the first two years in the senior school.

The folding for the simplest case of joining presents no difficulty. The two uniting stitches, the seaming and the running, however, require careful teaching. They should be taught on the same plan, and following the same order, as the hemming stitch. By comparison with it, the methods of starting, joining, and fastening off in seaming, can all be determined by the children. A well prepared diagram illustrating the position of the work should also be kept before the children's notice. The relative values of seaming and running should receive attention. Finally the pupils may make bags for brushes and dusters, cushion covers, iron and kettle holders, doll's clothes. If these last are allowed, the teacher must require as careful work as in any other articles. They are small and easy to manipulate, and so are of great service in training the children to fold and fix without help.

The Arrangement of Fells.

The seam and fell and the run and fell naturally follow next. Before the teacher presents any definite plan, the children should realise why fells are needed. We will suppose therefore that a class is trying to arrive at a method of dealing with the raw edges on the wrong side of a seaming exercise. The children may propose to fell each edge down on the two sides of the seam. The teacher having illustrated the want of strength in such a plan, the next proposal may be to fell both edges down on to the same side of the seam.

The thickness of this fold would be shown. Then the children will see that only one edge need be folded twice. Now they can understand why the double fold is made on one piece, and the single fold on the other. Too frequently this plan is merely given as a rule of thumb to the pupils who do not see its reason or its purpose.

Another method successfully tried is one which prevents the common fault of children's seams and fells—the raw edge of the double fold protruding into the seaming stitches. Let the children turn a deeper single fold on one of the pieces than upon the other. After the seaming is finished let them open the pieces and arrange for a fell. No double fold can confuse, and there is no protruding of raw edges in this method. The amount of the deeper turning is decided by comparison with a hem. In arranging the fell—which, even in the ordinary method, requires careful readjustment at this stage—after flattening down the seam, lay the folds back on each side of it. Turn the necessary amount on the deeper one, lay back this double fold upon the single turning and tack. This method will be employed later for fells when machines are introduced, and is therefore to be preferred to the one described above. The articles to which the fells are applied provide the requisite practice during the second year. Such are pillow-slips, cooking-sleeves, pinafores, and dolls' garments.

Preparatory Exercises for Garments.

Pleating, making of bands, sewing on of tapes form part of the third year's work. Then garments requiring these exercises can be begun. Such are the cooking and carpenter's aprons, the child's petticoat and bodice, and the cottage pinafore. The children's co-operation will be very helpful at this stage. Thus, in the pleating exercise the class can determine all the main points. The material to which it is appropriate, the regularity and position of the

pleats, the ways of fixing can all be discovered by the girls. Backstitching, for the sewing on of tapes and strengthening purposes, must be introduced now, but should first be taught on coarse material and without the drawing of threads.

Herring-boning.

Flannel vests and petticoats for children will form part of the fourth year's syllabus. As the herring-bone stitch which is used for flannel material requires considerable practice, it should be introduced if possible in the third year. The children will readily grasp its advantages for hems and fells occurring in woollen garments if they are allowed to make trial of the awkwardness which arises in folding flannel material. The reason for leaving the raw edge, and for securing it by some deep stitch like the herring-bone, will at once present itself to them. The neatness of the stitch on the right side, the strength of the cross stitches, and the manner in which they prevent the edge from fraying are general characteristics of herring-boning which will quickly attract attention. The stitch itself is somewhat intricate in character, and for this reason it is advisable to allow the girls to work on coarse canvas for the early practice. This preliminary canvas work is the more justifiable since herring-boning is also an ornamental stitch. The order of teaching will be upon the following lines :—

(*a*) Each child should be provided with a partly finished row of herring-boning, for analytic purposes. Every girl can then find for herself the necessary points, and the difficulty of seeing and handling the teacher's enlarged apparatus is removed. These specimens can be prepared by a class which already knows the stitch, and they are very convenient whenever the analysis of the stitch to be taught will involve unpicking. It is not a wise plan to use a diagram alone as the basis of working in this case, as the

complication of the lines and cross stitches tends to confuse a class. Diagrams are often sufficient, however, for the older children, as in the case of feather-stitching. Their use trains the girls in self-reliance and lessens the teacher's work. For these reasons the older pupils should be encouraged to make frequent use of the instructions and diagrams given in text-books on needlework.

(*b*) The analysis of the herring-boning by the children should show how the last stitch and the one preceding it have been produced, and should lead to the next position necessary for the needle. Then would follow demonstration by the teacher, and revision by a diagram. In all probability the children would require to work each step simultaneously with the teacher. The counting of threads, to which recourse must be had at first, should be quickly superseded by sight estimation of the place at which the needle must be inserted.

(*c*) The corners may be taken next, and taught on the same analytic principle unless the children are sufficiently advanced to attempt the turning alone.

(*d*) Lastly will come the application to the flannel seams, the new difficulty of the fold requiring care. Garments taken later in the school course will show the use of herring-boning for such materials as velvet and heavy cloths. Its unsuitability for a deep hem round a skirt, where the perpendicular threads of the material would tend to drag away from the horizontal ones, should also be understood before the subject is finally left.

We have now reached the stage at which the cutting out and repair of garments will constitute an essential part of the course. As this work introduces us at once to the need for buttonholes and for the gathering exercise, and as these are the chief stitches still requiring attention, we will

consider them before passing on to the above aspects of needlework.

Button-holes.

Button-holes and the button-hole stitch necessitate a preliminary discussion which will include such questions as the following :—

(*a*) The position of button-holes on garments and their advantages and disadvantages as compared with other methods of fastening, such as hooks and eyes, loops and buttons, strings.

(*b*) The nature of the strain to which the hole is subjected, its consequent direction, and the requirements of a well-cut hole.

(*c*) The peculiarity of the stitch employed, which by virtue of its knotted chain edge prevents the fraying of the edge and the wearing of the stitches by the friction of the button. The depth of the stitches, their regularity, and the amount of space allowed between them, must all be considered in their dependent relation to the material upon which the button-hole is to be made.

The method of direct instruction will be most appropriate in this case. By allowing at first the use of the folded edge of coarse soft linen or cheese cloth, the teacher will minimise the children's difficulty in obtaining regularity of stitch, and will thus enable them to concentrate their attention upon the knot formation. A clear diagram showing how to place the double cotton round the needle from left to right, if drawn before the girls, will help them to correct their own mistakes during the practice work, and they should be required at first to refer to it constantly. As soon as the stitch presents no further difficulty, the double raw edge should be introduced, after which the button-hole itself should be begun. The first button-holes should be worked upon coarse material in which, however, a hole should always be cut.

The round and square ends require careful treatment. The method of discontinuing the knotted edge so that the button may slip easily into the corner, should be compared with the alternative plan of retaining the knot but lessening the number of stitches made round the end. The use of the stiletto in obtaining a resting-place for the button in coats and jackets may be inferred by the pupils. In the case of the square end, the way in which the bracing threads close the hole should not be forgotten. Then follows the working of button-holes upon calico and other materials. The children should cut their own holes to fit the size of button set on. Later, cases requiring the preliminary overcasting of frayed edges will be dealt with, and the girls will learn what substances to employ in button-holing on different classes of material.

The Gathering Exercise.

The gathering exercise is necessary for most of the garments the children can make. The teacher will find that the setting-in of the gathers presents the most difficulty. To stroke them beforehand greatly facilitates the arrangement into the band, and this should be taught with the help of a good diagram. The children must learn to estimate the amount of material suitable to given lengths of band according to its nature. The exercises worked should require the manipulation of gathers in contact with seams, hems, and sleeves, and the pupils should learn how to slacken those which adjoin plain material. The exercises should, therefore, be useful and possible, and may include parts of garments made half-size, as, for example, the strapped pinafore or the lower part of a sleeve. The children should also be taught how to arrange gathers so as to form a heading when the gathers are not to be set into a band.

Cutting-out and Making of Garments.

5. The cutting-out and making of garments can now be carried on to a greater extent. The work involves the learning of given patterns, the adaptation of these according to individual needs, and the invention of new patterns and styles by the children.

Scheme of Garments.

Simple garments suitable for each year are easy to find. For the *third year*, the cooking apron, cooking sleeves, child's petticoat and bodice, flannel vest (to be made up in the fourth year), cottage or slotted pinafore are all suitable. In the *fourth year*, the strapped pinafore, yoked pinafore, children's knickerbockers, or the petticoat with gathers may be chosen. The *fifth year* may undertake the yoked overall with sleeves, simple blouses, and the gored petticoat with circular band. The *sixth* and *seventh years* will pass on to the cloth knickerbockers, bodices, night dresses, night shirts.

Drafting of Patterns.

The drafting of the pattern is the first undertaking in the construction of any garment. This should be done by the pupils from actual measurements and observation of their own figures. A preliminary conversation between the teacher and her class concerning the purpose of the garment to be made should result in the formation by the girls of a definite conception of the shape and general proportions necessary. Before going further, the girls should be asked to express this conception in a drawing. Thus, in drafting a yoke pattern, after certain conclusions concerning the purpose and shape of a yoke have been reached, the pupils should be required to draw the essential features of a yoke. This necessitates the careful analysis of the idea existing in their minds, and puts explicitly before them the end in view.

After this has been done the pattern must be made definite and valuable by being limited to individual measurements. Instruction in the art of measuring should take a well defined place in this branch of the needlework syllabus. The pupils should have practice in measuring one another and should know the most suitable points from which to calculate their distances. It is only by such instruction that they will be able in later life to construct patterns and to alter bought patterns. After they have decided upon the various lengths and breadths requisite in any given garment they should draw the exact pattern in their books. In these books notes concerning the making-up of the garments should also be entered. Sectional paper renders the drawing easy, and assists the ready comprehension of the pattern when drawn. The pattern should always be drawn as it would be cut. Therefore, if the material can be folded in order to facilitate the cutting, that view is the one which should be represented.

After the patterns have been drafted, they should be cut out in paper and then the whole garment or parts of it should be cut out and made up in material. To prevent waste the pupils may pin the paper pattern upon the material and then cut. For garments which do not require to fit exactly folding patterns are useful, as the position of the various curves and slopes can easily be retained in the memory by means of the divisions upon which they fall. The same unit of folding should be used for all garments, however, or confusion may result. The pupils should draft these patterns from real measurements just as in other cases, and it should be remembered that simplicity is the great feature of these folding patterns. If that is lacking they fail utterly in their purpose.

Making of Garments.

As a rule one or two garments are made up entirely during a school year, whilst only the more difficult portions of the others given in the scheme are made up in material. It is certainly wiser, more especially in the highest classes, to take up several garments—comparing and correlating them, and making up the peculiar parts of each—than to confine the children to the construction of one elaborate garment. The whole garment should always first be studied, however, and it is often helpful to tack together the paper pattern, but there should be no detailed work in paper. Only after the general plan of the garment is understood should particular parts of it be made up.

The following exercises suggest themselves in connection with the above syllabus :—

The fifth year set garment being the yoked overall, the shaped collar band for a blouse, the circular band in calico, the plaquet hole in flannel, the hems at the bottom of the flannel petticoat may be practised in connection with the other garments.

The girls in the sixth year may be making the divided skirt and under-bodice. The upper part of the nightdress, the nightdress front opening, the gusset for the shirt seams, the facing of garments would all be suitable exercises, and many others may be chosen.

Throughout, the work should aim at preparing for the dress-making course in the seventh year and the higher school. In the case of the garments which are to be finished completely during the year, before the pupils attack the actual material they should have practised the parts presenting difficulty, so that wastefulness may be avoided. No slipshod contrivances should be allowed to pass, yet each girl should be entirely responsible for her own work both as regards the cutting and making.

The Use of Sewing Machines.

6. One of the ways by which it would be possible to have more garments made during the school course is by the introduction of sewing machines into the upper classes of the school. By their help much more work can be accomplished in the time, since hand sewing, except in the necessary parts, can be dispensed with. The pupils would also learn to use the methods which they will find possible and convenient by means of the sewing machine after school life, and this is a great consideration.

The expense of the machines necessarily causes the supply to be limited in number. It is, therefore, absolutely essential to sub-divide the class during the teaching, although a certain amount of class instruction can be given by the help of models and drawings on such points as threading the needle and shuttle. Generally speaking, however, the teacher will find it necessary to demonstrate the various actions of the machine to a small number of pupils at a time. The other girls would meanwhile be engaged in fixing or sewing the parts of the garments which are independent of the use of the machine.

The individual practice by the children upon the machine should be carefully supervised in order to prevent accidents to either children or machine. At first very unimportant articles such as dusters and kettle holders should be stitched, so that the girls may acquire control in guiding the work. The teacher may find it necessary to start and stop the machine, so that the attention of the pupil may be given to the actual stitching until that presents less difficulty.

If advantage be taken of the opportunities for practising afforded in the homes of many of the girls, the task will become less arduous for the teacher. Trustworthy girls who have thus acquired sufficient control in stitching

by the sewing machine may be allowed to supervise the practice of the weaker members of the class, and thus set the teacher at liberty to attend to the rest of the pupils. There is no reason also why the girls of the upper classes should not stitch the longer seams and fells occurring in the garments made by the younger children, who would thus have more time to devote to the much more important work of fixing and planning. The use of the sewing machine cannot be over-valued, and this is being more and more recognised to-day.

Practical Repair of Clothing.

7. The repair of clothing will naturally be considered as the various garments are undertaken. It divides itself broadly into the darning and patching of worn goods. It is a good plan to encourage the bringing to school by the children of garments actually needing repair, as the school is thus brought into close and helpful relation to home life. If for any reason this is not thought practicable the teacher should at least provide herself with some garments needing repair. Often the children can make use of the parts of garments previously made by them if a little foresight is used by the teacher, and the real difficulties of repairing can thus be dealt with. It is, however, advisable to commence with such very simple cases as the square patch, and to devote the first attention to the general principles involved.

In the first place, the patch or darn must give strength. Therefore it must be considerably larger than the hole, the selvedges must concur, the material used should be slightly worn and should first be washed if necessary to prevent shrinking, the stitch employed should not be too strong for the worn garment, for instance, in many cases it should not be seaming. In the case of the darn, loops must be left at the ends of the lines because of the shrinking,

alternate threads must be taken because of the undue strain otherwise, and so, too, a square shape is inadvisable since it places all the strain of the edge upon the same rows of weak threads in the garment: a diamond or vandyke shape is preferable. Secondly, the repair must show as little as possible, and upon this rests the choice of material used, the matching of the pattern and the method of working.

Suitable Exercises.

The single darn for a weak place may be taught in the third year, when flannel garments are introduced. Though more quickly learned on canvas, it should next be applied to flannel or woollen material. The stocking web darn should also be applied in such garments as vests and jerseys. Stocking mending should be a regular exercise in the fifth and subsequent years. The girls of the sixth and seventh years should learn how to deal with hedge tears, and also to repair table linen. It is undesirable to cause a great strain upon the eyesight, and therefore for mere practice a very coarse linen or Saxony cloth may be used in the case of the cross-cut darn.

The patching of articles should play a very large part in the curriculum of the fifth and higher years. After the simple square forms have been mastered, such typical exercises as the following are requisite—sleeves worn under the arm, where a shaped patch is necessary, and the seams and hems must be undone before the patch is inserted; knickerbockers worn at the knee, or gathers torn near the yoke of a pinafore, where the bands or yoke must be opened, the patch placed in position and inserted, and the gathers once more set into the band or yoke; the pinafore torn at the corner; torn buttonholes, and other cases requiring a modification of the simple forms already taught. The repairing of dresses, coats, trousers, should also be studied in the

highest class. Throughout, the teacher should not be satisfied with merely teaching one method. The condition of the garment determines the amount of labour which should be expended upon it, and therefore economy of time must modify the elaborateness of the method.

No part of the needlework course has a closer relation to the girl's home life than this of repairing, provided always that teachers interpret it in its broadest aspect. Throughout, the pupils must be encouraged to seek for methods by themselves rather than required to imitate those of the teacher, for no amount of school instruction can cover the innumerable forms in which the need for repairs may present itself. The school can only hope to establish a foundation of general principles upon which the girl may base her efforts both now and in later life.

Knitting.

8. So far knitting has not been considered, though it is still generally taught in spite of the inroads of machine knitting upon the hand craft. As a rule, knitting processes lie outside the inventive powers of the children. Therefore direct imitation of the teacher's instruction must be the ordinary form of instruction. As in the case of all the preceding exercises, the application of the knowledge gained to actual garments should be the aim.

Up to the close of the second year, plain and purl knitting and their use for such things as scarves, cuffs, children's reins will occupy all the children's time. In the third year, when the manipulation of the four needles is not too difficult for the girls, the stocking may be begun. The various exercises concerned in its construction will be mastered in the fifth year, when the girls should be able to make a complete stocking. The intakes at the back of the stocking present no difficulty and can easily be suggested by the children. So too, when the method of turning the heel has been taught, that of taking off the toe of the foot

should be readily suggested by the girls, who can locate the places for the decreasings and determine the number of rounds which should be made between each set of decreasings. Vests, gloves, and in the highest classes the knitting of lace, can all be introduced into the course.

Demonstration for knitting is rendered much easier for the teacher by the use of very large wooden needles and coarse wool. This apparatus decreases greatly the amount of individual help which would otherwise be necessary. The value of clear diagrams is also considerable, and it should be remembered that these are more effective if drawn during the lesson. The girls are then able to follow, and sometimes to assist in, the construction of the drawing, and they more readily appreciate its reference when it is built up by comparison with a process which they have just witnessed. For some of the more intricate exercises permanent diagrams should be provided by the school. The making of the plain and purl knitting stitches, the joining of wool, the arrangement of the stitches and location of the narrowings when turning the heel and taking off the toe can all be clearly illustrated by diagrams.

An exercise which should not be omitted from the teaching of knitting is that which involves the picking up of stitches which have dropped from the needle. Also the neat process of grafting off the final stitches of the foot of the stocking deserves to be more widely taught than is usual. It prevents any hard ridge or lump, being in reality a continuation of the knitting stitches. If practised in the first place upon stocking-web material it is quite simple enough for the elder girls.

Finally, the use of hard knitting cotton is greatly to be deprecated. Soft, firm, pliable wool should alone be placed in the hands of the younger children at least.

9. In conclusion we would once more urge upon the

teacher the necessity of imbuing her pupils with a sense of the importance attaching to the study and practice of needlework. The influence of the work done during the girl's school life upon the attitude which she will adopt later towards a craft which is essential in every grade of society, cannot be over-estimated. Therefore the teacher should realise to the full the necessity for such a choice of subject-matter as will bring the girl at once into touch with the pressing needs of life.

Conclusion.

Thus, and thus only, will ignorance and improvidence in the matter of making and repairing clothes be superseded by economy, foresight and skilful adaptation of method according to the demands of circumstances. For it should be remembered that the methods which are taught in school will not be limited in their application to the present age. Provided only that the pupil finds those methods applicable in actual practice, they will, by the agency of family life, be passed on through succeeding generations in forms modified by the new requirements of new times. It is because needlework has such a universal bearing upon life in all ages and at all times that it is assigned a place in the curriculum of the school. Therefore the teacher should always approach with earnestness and careful consideration a subject which under an unassuming guise yet plays so valuable a part in human life, for

> "Till the world be quite dissolv'd and past
> So long at least the needle's use shall last."[1]

---

[1] John Taylor, *The Praise of the Needle.*

The following books are recommended to the teacher :—

[1] Agnes Walker: Needlework and Cutting Out	5/- (Blackie & Son).
Elizabeth Roseveas: Text-Book of Needlework, Knitting, and Cutting Out	6/- (Macmillan & Co.).
Fanny Heath: Pattern Making by Paper Folding	2/- (Longmans, Green, & Co.).
Bertha Banner: Manual on the Cutting Out of Undergarments	1d. (Longmans, Green, & Co.).

[1] Specially recommended for diagrams.

INDEX.

PRINTED AT THE BURLINGTON PRESS, CAMBRIDGE.

1907 and 1908.

PRELIMINARY CERTIFICATE

AND

CERTIFICATE

EXAMINATIONS,

1907 AND 1908.

London: W. B. CLIVE,

University Tutorial Press Ld.

157 Drury Lane, W.C.

March 1907.

PRELIMINARY CERTIFICATE EXAMINATION.

PART I.

IV.—Composition.

English Composition. From the English Course by W. H. LOW, M.A., and JOHN BRIGGS, M.A. 1s. 6d.

"This is undoubtedly one of the very best of the various manuals published upon the subject of English Composition."—*Teachers' Times.*

V.—Arithmetic.

Arithmetic for the Preliminary Certificate Examination. Adapted from the "Tutorial Arithmetic" by R. H. CHOPE, B.A. 2s. 6d.

"Mr. Chope's new book deserves to be strongly recommended for the use of candidates."—*School Guardian.*

Model Answers to Arithmetic Questions for the Preliminary Certificate Examination. Containing full Solutions to the Scholarship Papers in Arithmetic from 1899 to 1906. 6d. [*In the press.*

PART II.

A. I.—English Language and Literature.

English Composition. (*See above.*)

Preliminary Certificate English Grammar. Being the Grammatical Portion of "Our Mother Tongue." With Questions. By H. M. HEWITT, M.A., LL.M., and GEORGE BEACH, M.A., LL.D. 2s. 6d.

"We think that acting teachers studying the grammatical portion of the Preliminary Certificate Syllabus cannot find a better guide."—*Teachers' Aid.*

An Anthology of English Verse. With Introduction and Glossary. By A. J. WYATT, M.A., and S. E. GOGGIN, B.A. 2s.

A. II.—History.

Preliminary Certificate British History. Being "The Tutorial History of England," in five Parts, with an Introduction to each. By C. S. FEARENSIDE, M.A. Oxon. (1) 1017-1399, (2) 1399-1603, (3) 1603-1714, (4) 1714-1815, (5) 1815-1870, 1s. each Part.

A. II.—History—*continued.*

Outlines of British History. By M. E. Carter. 2s. 6d.

In order to meet the exact requirements of the syllabus, European events, which are dealt with throughout the book in their relation to British History, have been treated more fully in a concluding chapter by Mr. F. N. Dixon, author of *Main Landmarks of European History.*

Main Landmarks of European History. By F. N. Dixon, B.A. 2s.

"To tell the story of nineteen hundred years in 140 pages is a task which might tax the ingenuity of the best. Yet we must confess that Mr. Dixon has here successfully given us an outline of the main events."—*School World.*

Elements of the Duties and Rights of Citizenship. By W. D. Aston, B.A., LL.B. *Second Edition.* 1s. 6d.

"Students using this book need have no fear in facing any searching examination in this portion of their syllabus."—*Teachers' Aid.*

OPTIONAL SUBJECTS.

B. I.—Languages.

LATIN.

Junior Latin Course. By B. J. Hayes, M.A. 2s. 6d.

"Pupil teachers will find this book excellent."—*Practical Teacher.*

Junior Latin Reader. By E. J. G. Forse, M.A. 1s. 6d.

"The work is well graduated, the passages of convenient length and well selected."—*Schoolmaster.*

FRENCH.

Weekley's French Course. *Preliminary Certificate Edition.* By Ernest Weekley, M.A. 2s. 6d.

"This volume should well serve its purpose."—*School Guardian.*

Weekley's French Reader. *Preliminary Certificate . Edition.* By Ernest Weekley, M.A. 1s. 6d.

"A very useful first reader with good vocabulary and sensible notes."—*Schoolmaster.*

B. II.—Elementary Mathematics.

Arithmetic (*See p.* 2).

Deakin's Algebra. *Preliminary Certificate Edition.* With a Section on Graphs. By RUPERT DEAKIN, M.A. 3s. Also separately: **Preliminary Certificate Graphs**, in paper covers, 3d.

Workman and Cracknell's Geometry. *Preliminary Certificate Edition.* (For Course A.) By W. P. WORKMAN, M.A., B.Sc., and A. G. CRACKNELL, M.A., B.Sc., F.C.P. 2s. 6d.

Deakin's Euclid, Books I., II., III. *Preliminary Certificate Edition* (for Course B). With Mensuration, and Practical Problems arranged in accordance with Euclid's Order of Proof. By RUPERT DEAKIN, M.A. 2s. 6d.

Model Answers to King's Scholarship Algebra: Containing the papers in Algebra set to Scholarship candidates, 1893 to 1904, with Full Solutions. 6d.

B. III.—Elementary Science.

Elementary Science for the Preliminary Certificate Examination.

General Section. Edited by R. W. STEWART, D.Sc., and WM. BRIGGS, LL.D., M.A., B.Sc. 2s.

"Students will find the volume very trustworthy, and admirably suited to their needs."—*Teachers' Aid.*

Section A: Chemistry. By H. W. BAUSOR, M.A. 2s.

"A work of genuine educational value. Students cannot do better than study Section A under Mr. Bausor's skilful guidance."—*Teachers' Times.*

Section B: Physics. By J. SATTERLY, B.Sc. 2s.

"The publications of the University Tutorial Press may always be recommended among the best. This book may be cordially recommended."—*Education.*

Section C: Plant and Animal Life. By W. S. FURNEAUX. 2s.

"It is brightly and plainly written and abundantly illustrated. Students will find it exactly suited to their requirements."—*Teachers' Aid.*

(FOR SYLLABUS NO. II., 1908.)

Plant Biology. By F. CAVERS, D.Sc., Professor of Botany, Hartley College, Southampton.

Ready in April.

Examination Questions for Preliminary Certificate Candidates: Containing the questions in all the usual subjects set at the Scholarship Examinations from 1899 to 1905, with answers to the Arithmetic and Algebra Questions. 6d.

CERTIFICATE EXAMINATION,

1907 and 1908.

Section B.—The Principles of Education.

Principles and Methods of Teaching. By J. WELTON, M.A., Professor of Education in the University of Leeds. 4s. 6d.

"This valuable and thoughtful book."—*The Speaker.*

School Organisation. By S. E. BRAY, M.A., Inspector of Schools to the London County Council. 2s.

"A useful and sensible guide not only on organisation in the narrower sense, but on such matters as discipline, class-teaching, school furniture, etc."—*Journal of Education.*

School Training. By R. E. HUGHES, M.A., Author of "The Making of Citizens." 2s.

"This volume will be found of use to all teachers, for it discusses some important problems in a very intelligent manner."—*Schoolmaster.*

School Hygiene. By R. A. LYSTER, M.B., B.Ch., B.Sc., D.P.H. [*In preparation.*

Section F.—English Language, Literature, and Composition.

1. English Composition. From the "English Course," by W. H. LOW, M.A., and JOHN BRIGGS, M.A. *Certificate Edition.* 1s. 6d.

"The matter is clearly arranged, concisely and intelligently put, and marked by accurate scholarship and common sense."—*Guardian.*

3. (*a*) An Anthology of English Verse. With Introduction and Glossary. By A. J. WYATT, M.A. Lond. and Camb., and S. E. GOGGIN, B.A. Lond. 2s.

FOR 1907.

2. (*a*) Shakespeare.—Midsummer Night's Dream. By A. F. WATT, M.A. Oxon., B.A. Lond. 2s.

2. (*b*) Milton.—Paradise Lost, Books I., II. By A. F. WATT, M.A. 1s. 6d.

"A well-printed text with clear, concise notes and a suitable introduction."—*School Guardian.*

For 1908.

2. (*a*) **Shakespeare.—Richard II.** By A. F. Watt, M.A. Oxon., B.A. Lond. 2s.

2. (*b*) **Bacon.** Selected Essays set for the Certificate Examination, 1908. By A. F. Watt, M.A., and S. E. Goggin, B.A. 6d.

Section G.—History.

For 1907 and 1908.

Outline of the History of Great Britain. Being the *Tutorial History of England*, by C. S. Fearenside, M.A. Oxon., with a supplementary chapter on the History of Scotland. 4s. 6d.

"Very able, well written, and practical."—*Educational Times.*

For 1907.

England under the Stuarts: A History of England, 1603-1688. By C. S. Fearenside, M.A. 2s. 6d.

"Clear, vigorous, and well written throughout. As a manual for the student the book is an ideal production."—*Teachers' Monthly.*

For 1908.

History of Great Britain, 1688-1760. By C. S. Fearenside, M.A. Specially edited for the Certificate Examination, 1908. 2s. 6d. [*In the press.*

Section H.—Elementary Mathematics.

Workman's Arithmetic. *Certificate Edition.* By W. P. Workman, M.A., B.Sc. 3s. 6d.

"In its general arrangement, explanation of principles, and excellent examples it is a distinct advance on most existing text-books."—*Practical Teacher.*

ALGEBRA.

For Part I. **Deakin's Algebra.** *Preliminary Certificate Edition.** With a Section on Graphs. By Rupert Deakin, M.A. 3s. Also separately: **Preliminary Certificate Graphs,** in paper covers, 3d.

Model Answers to Scholarship Algebra.* Containing the papers in Algebra set to Scholarship candidates, 1893 to 1904, with Full Solutions. 6d.

* In this subject the Syllabus for the Certificate Examination, Part I., is practically identical with the Preliminary Certificate Syllabus.

FOR PART II. **The Certificate Algebra.** By WM. BRIGGS, LL.D., M.A., B.Sc., and RUPERT DEAKIN, M.A. 2s. 6d.

"The course is sound and scholarly, and the bookwork plainly and lucidly demonstrated."—*Teachers' Aid.*

Certificate Graphs. By C. H. FRENCH, M.A., and G. OSBORN, M.A. 6d.

"This little book ranks among the best. Certificate students will be well advised to procure a copy."—*Teachers' Aid.*

GEOMETRY.

COURSE A.

FOR PART I. **Deakin's Euclid.** Books I., II. By RUPERT DEAKIN, M.A. 1s.

"A very good edition of Euclid, and adapted to the end in view."—*Schoolmaster.*

FOR PARTS I. AND II. **Deakin's Euclid.** *Certificate Edition.* Books I.-III., IV. (1-10), VI. (1-19). By RUPERT DEAKIN, M.A. 2s. 6d.

COURSE B.

FOR PART I. **Workman and Cracknell's Geometry.** *Preliminary Certificate Edition.** By W. P. WORKMAN, M.A., B.Sc., and A. G. CRACKNELL, M.A., B.Sc., F.C.P. 2s. 6d.

"It is very well and thoughtfully prepared, and will serve as a most excellent introduction to the subject."—*Teachers' Monthly.*

FOR PART II. **Certificate Geometry.** By W. P. WORKMAN, M.A., B.Sc., and A. G. CRACKNELL, M.A., B.Sc. [*In preparation.*

Section I.—General Elementary Science.

(INCLUDING NATURE KNOWLEDGE.)

Certificate General Elementary Science: PART I. **Physiography.** Edited by R. W. STEWART, D.Sc.

First Edition (for 1907). 3s. 6d.

Second Edition (specially rewritten for the 1908 Syllabus). [*In the press.*

"The book is in every way a most satisfactory one. Certificate students will be well advised to get this particular book and study its contents thoroughly."—*Schoolmaster.*

* In this subject the Syllabus for the Certificate Examination, Part I., is practically identical with the Preliminary Certificate Syllabus.

Certificate General Elementary Science: PART II. Biology (Plant and Animal Life). By W. S. FURNEAUX. *Second Edition.* 2s. 6d.

"As a class book it ranks exceedingly high, and deserves to be widely used. The illustrations are remarkably clear and appropriate, and will provide an admirable aid to the student."—*Teachers' Aid.*

Sections J. and K.—Languages.

LATIN.

Hayes and Masom's Latin Grammar. *Certificate Edition.* By B. J. HAYES, M.A., and W. F. MASOM, M.A. 3s. 6d.

"We have nothing but praise to bestow on the very admirable and serviceable book before us."—*School Government Chronicle.*

Latin Composition. *Certificate Edition.* By A. H. ALLCROFT, M.A., and J. H. HAYDON, M.A. 2s. 6d. KEY, 2s. 6d. *net.*

"Very clear and concise. The work thoroughly deserves the success it has achieved."—*Teachers' Monthly.*

Selections from Latin Authors. *Certificate Edition.* By A. F. WATT, M.A., and B. J. HAYES, M.A. 2s. 6d. KEY, 2s. 6d. *net.*

"The selections have been edited with all the care and expert knowledge of examination needs that long experience has given."—*Schoolmaster.*

Latin Construing Book, Matriculation. By A. F. WATT, M.A., and B. J. HAYES, M.A. 2s. KEY (*in the press*), 2s. 6d. *net.*

FRENCH.

Weekley's French Course. *Certificate Edition.* By E. WEEKLEY, M.A. 3s. 6d. KEY, 2s. 6d. *net.*

"Certificate students will find all that is necessary for their needs in this volume, which is written by a French scholar of no mean ability."—*Teachers' Aid.*

Perret's French Reader. *Certificate Edition.* 2s. 6d. KEY, 2s. 6d. *net.*

"The notes are admirable. Candidates will find the course a valuable preparation for the Certificate examination."—*School Guardian.*

French Prose Reader. Edited by STÉPHANE BARLET, B. ès Sc., and W. F. MASOM, M.A. 2s. 6d. KEY, 2s. 6d. *net.*